TEXTILE TECHNOLOGY DIGEST

VOLUME 13 AUGUST, 1956 NO. 8

ABSTRACTS

FIBERS A

The modulus of dynamic elasticity as a reference quantity for the classification of filament yarns.

I. H. de Vries. *Enka Breda Rayon Rev. 10:* 53-59 (April, 1956).

Because the modulus of dynamic elasticity provides a convenient physical quantity governed very largely by the state of orientation of the chain molecules and enables a certain differentiation to be made between fibers varying in chemical constitution it is used as a means for the classification of fibers and is shown to compare favorably with the results obtained by the more complicated stress-strain curves. Tables. Graphs. 12 references.

Textile raw materials (fibers). Classification and definition of terms—review of types and products.

Swiss Association for Documentation. *Textil-Rundschau 11, No. 1:* 30-31 (1956); *in German.* Through *BCIRA 36:* 239 (1956).

The Classification and Definition Sub-Committee of the Textile Documentation Committee of the Swiss Association for Documentation (SVD) presents a classified list of all textile raw materials, with definitions of chemical fibers, in order to standardize the terms and nomenclature for fibrous materials. This is supplemented with a table by P. A. Koch comprising all types of, and products from, natural and chemical fibers.

NATURAL FIBERS A 1

Cotton fiber elongation and tenacity as related to some fiber and yarn properties.

K. L. Hertel and C. J. Craven (Tennessee Agricultural Experiment Station). *Textile Research J. 26:* 479-484 (June, 1956).

An extensive analysis of correlations among Stelometer readings and other available measured properties (yarn appearance, % picker and card-waste, nep count, skein strength, and x-ray angle) for a large number of cottons was made. The only yarn property found to be definitely correlated with fiber bundle elongation was yarn elongation. Fiber bundle elongation was also correlated with x-ray angle and less strongly with tenacity measured at zero gauge length. Skein strength was highly correlated with tenacity measured at ⅛ inch gauge length. Stelometer values of tenacity and elongation were very highly correlated with Instron values on the same cottons. Tables. Graphs. 12 references.

Determination of the friction coefficient of fibrous material.

W. F. du Bois. *Tex 15, No. 2:* 162-168 (1956); *in Dutch.* Through *BCIRA 36:* 321 (1956).

This is a preliminary publication of the more important results obtained with a Cambridge extensometer. The measurements indicate that the friction coefficient for cotton is independent of fiber maturity, and is a specific fiber property.

Cotton mixings. Useful information and new experiences.

Bull. Inst. Textile France No. 57: 61-71 (December, 1955); *in French.* Through *BCIRA 36:* 273 (1956).

The relationship between the fineness of cotton and its spinning behavior, the effect of fiber fineness on yarn quality, the effect of the twist coefficient, and the importance of intimate mixing are discussed. 16 references.

The formation and prevention of neps during processing of cotton. Part 2.

H. P. Hartenhauer. *Textil- u. Faserstofftech. 5, No. 12:* 645-649 (1955); *in German.* Through *BCIRA 36:* 165 (1956).

For Part 1 see *TTD 13:* 225 (1956).

Improved cotton bale packaging and its effects at the mill.

G. W. Pfeiffenberger (National Cotton Council). *Textile Research J. 26:* 470-478 (June, 1956).

The author discusses problems associated with cotton baling and presents in tabular form the

comparative performance at the gin, compress and mill of bale covers made of experimental materials (burlap laminates, nonwovens, paper, plastics) and customary materials (jute and sugar).

Effects on machine picked cotton of relative humidity and spindle moisture.

O. B. Wooten and R. A. Montgomery. *Cotton Gin and Oil Mill Press 57:* 7-8 (March 24, 1956).

Since, in terms of final seed cotton moisture, it appears from the data reported that prevailing atmospheric conditions exert a greater influence than do different rates of moisture applied to spindles in picking, it is suggested that the operator should wait long enough for the excess moisture to dry before entering the field with the picker and that the water flow to the spindles should be adjusted to give a minimum amount of moisture to clean the spindles and give high picking efficiency.

The chemistry of jute fiber.

P. B. Sarkar (Indian Central Jute Committee). *Ann. Sci. Textiles Belges No. 2:* 45-54 (June, 1956).

45 references.

A comparative study on some chemical characteristics of jute and Hibiscus fibers.

W. G. Macmillan, A. B. Sen Gupta, and A. Roy (Indian Jute Mills Assoc.). *(Letter to the editor). J. Textile Inst. 47:* T299-T300 (May, 1956).

The theory of fiber extraction. Chapter 3. The structure of vegetable fibers (continued).

J. G. Thieme. *Textile Quart. 6, No 1:* 28-36 (1956).

Genetic and environmental variability of percent fiber and other characters in monoecious hemp, Cannabis, Sativa L.

C. V. Feaster. *Textile Quart. 6, No. 1:* 43-47 (1956).

International Wool Textile Research Conference.

Textile Research J. 26: 361-384 (May, 1956).

Seminar papers presented in New York, November 17, 1955 under the auspices of the Wool Bureau in conjunction with the Textile Research Institute reviewing some of the more important findings disclosed at the International Wool Textile Research Conference in Australia in the fall of 1955: *General remarks on the conference* by J. H. Dillon; *Morphology and chemical modification,* by G. Laxer; *Highlights of papers on physical and protein chemistry,* by H. P. Lundgren; *Biology and manufacture,* by J. Menkart. A complete list of the papers and lectures presented at the Australian Conference are included in Appendixes p. 380-384.

Measurements of friction between single fibers before and after an oxidative treatment.

E. Alexander, M. Lewin and M. Shiloh. *Bull. Research Council Israel 5C:* 28-34 (1955). Through *Chem. Abstracts 50:* 8212 (June 10, 1956).

The coefficients of friction of wool fibers and human hair were measured before and after treatment with bromate solutions. All the friction coefficients increase after the treatment, but no significant change was found in the Directional-Frictional-Effect. It seems that in order to get better reproduction of similar measurements it is necessary to take crimp wool fibers into consideration.

New developments in silk.

Modern Textiles Mag. 37: 58-63, 75, 79 (July, 1956).

Current trends in silk supply, by G. Elbogen; *Silk in modern fabrics,* by F. Muller; *How silk is dyed today,* by R. M. Gutekunst.

Fur.

Ciba Rev. No. 114: 2-30 (April, 1956).

Furs on the world's markets; History of the fur trade; Fur dressing and dyeing; and *Furs and fashion.* 25 references.

The effect of aluminum powder on the heat insulation of goose down.

C. D. Niven. (National Research Council). *Textile Research J. 26:* 430-431 (June, 1956).

The effect on the thermal insulation value of goose down was examined when different amounts of aluminum powder were added by dusting. At low density considerable improvement was found to be possible. 5 references.

Asbestos reinforcements.

D. V. Rosato. *Modern Plastics 33:* 140-148, 202 (July, 1956).

The properties of Pyrotex felts and Novabestos papers, their use in asbestos-reinforced plastics, and the properties and applications of the latter are covered. 13 references.

MAN MADE FIBERS A 2

Processing fibers for functional fabrics.

J. A. Newnam (E. I. du Pont de Nemours and Co.). *Am. Textile Reptr. 70:* 33-35, 42-43 (June 7, 1956).

The fiber characteristics having the greatest influence on processing (tenacity, abrasion, resistance, crimp, crimp retention, resistance to permanent stretch, bulk, friction between fibers) are listed and problems associated with their spinning, weaving, dyeing and finishing are discussed.

Synthetic macromolecules and their importance in textile processing.

A. Hochtlen. *Melliand Textilber. 35, No. 11:* 1263-1268 (1954); *in German.* Translation in *Textile J. Australia 31:* 223-231 (April 20, 1956).

The synthetic macromolecules are characterized according to their structures and properties and classified as (1) condensation polymers e.g. polyamides, polyesters, urea resins, silicones (2) addition polymers e.g. polyurethane and (3) linear polymers e.g. polyvinyl alcohol, polyacrylonitrile, etc. Their applications in the manufacture of textile fibers and in textile finishing are described.

World man-made fiber producers.

Textile Organon 27: 90-96 (June, 1956).

This directory, arranged alphabetically by country, lists the manufacturers, the type of fiber produced by each and the trade name where applicable.

Studies on the technology of fibers as basis for a theory of nep formation in card and drawframe slivers from viscose staple fibers.

G. Nitschke. *Textil-Praxis 11, No. 2:* 111-115 (1956); *in German.* Through *BCIRA 36:* 210 (1956).

The problem of nep formation is reviewed, with special reference to the function of the hooklets at the fiber ends which intertwine with each other to form the neps. Depending upon the strength, elasticity and pliability of the fibers, these entanglements can be loosened to a certain extent with progressing parallelization of the fibers during carding and drawing. 19 references.

Photochemical degradation of polyamide fibers.

M. Schwemmer. *Textil-Rundschau 11, No. 1:* 1-15 (1956); *in German.* Through *BCIRA 36:* 223 (1956).

In this review, the author discusses the photochemical degradation of textile fibers in general, and photolysis and photo-oxidation (as a function of time) of polyamides nylon 6 and 66 in particular. Modern testing methods, elucidating the manner in which splitting of the chain takes place, are also reviewed, especially paper-chromatographic methods, quantitative nitrogen determination, water content determination to 65% r.h. and 20°C, behavior to 50% formic and 40% sulfuric acid, determination of the stress-elongation diagram, viscosity measurements, and end-group determination. The equipment and radiation measurements are discussed. 66 references.

The photochemical degradation of polyamide fibers. Parts 2 and 3.

M. Schwemmer. *Textil-Rundschau 11, No. 2:* 70-82; *No. 3:* 131-136 (1956); *in German.* Through *BCIRA 36:* 322 (1956).

The effects of short- and long-wave ultra-violet irradiation on the photochemical degradation of various polyamide fibers are discussed.

Properties of a new high-tenacity viscose fiber.

R. Temmerman. *Ann. Sci. Textiles Belges No. 4:* 111-120 (1955); *in French.* Through *BCIRA 36:* 207 (1956).

A new high-tenacity viscose fiber, characterized by a high degree of polymerization, reduced swelling and high wet-strength, has been examined with regard to loss of weight and wear and tear on washing; wear resistance on wetting; resistance to boiling; seam strength and tear strength on wetting; abrasion resistance in the dry and wet states. Results of laboratory tests show that the new fiber, Z54, exhibits an increased resistance to treatments involving either mechanical or chemical action on the swollen fiber. In this respect, this fiber constitutes a great improvement as compared with ordinary viscose fibers.

Protection of viscose rayon from wear by ultraviolet light.

S. Mine. *J. Home Econ. (Japan) 4, No. 2-3:* 32-34 (1954); *in Japanese.* Through *Chem. Abstracts 50:* 6053 (April 25, 1956).

Tests on elasticity, tensile strength, and color change indicate that rayon fibers which have been treated with tannin, pyrogallol, hydroquinone, thiourea, urea, salicylic acid, urea resin, thiourea resin, polyvinyl acetate, or polyacrylic acid resin emulsions show better properties than untreated fibers after exposure to ultraviolet light. The chemically treated fibers are protected in varying degrees from getting brittle.

The preparation of fibers from small quantities of protein solutions.

J. P. E. Human. (Wool Textile Research Laboratory). *(Letter to the editor). Textile Research J. 26:* 439-440 (June, 1956).

An apparatus for use with amounts of about 0.5 ml is described.

Teflon tetrafluorethylene fiber.

J. T. Rivers and R. L. Franklin (E. I. du Pont de Nemours and Co.). *Can. Textile J. 73:* 56-58 (May 18, 1956); 50-53 (June 15, 1956).

Survey of the basic information concerning the properties of Teflon and particulars of the growing catalog of its practical utility.

Polyethylene fiber today. Parts 1 and 2.

V. L. Erlich (Reeves Brothers, Inc.) *Modern Textiles Mag. 37:* 33, 46-48 (May, 1956); 37, 53-60 (June, 1956).

Molecular weight, extrusion and melting point, orientation, yield point and elastic limit, dimensional stability, and resistance to sunlight and outdoor exposure of I. C. I. type polyethylene monofilaments are discussed from the viewpoint of their potential use in textile applications. Mention is made of irradiated polyethylene and the Phillip's Petroleum Company linear polymer. 34 references.

Orientation upgrades polypropylene fibers.

Chem. Week 78: 64-66 (June 16, 1956).

Disadvantages (hydrophobicity, melting point, poor light stability, static) and advantages (solvent resistance and high tensile strength) of isotactic polypropylene fibers are discussed and they are compared with other synthetic fibers.

Crylor.

Societe Crylor. *SVF Fachorgan Textilveredlung 11, No. 2:* 90-92 (1956); *in German.* Through *BCIRA 36:* 268 (1956).

Mechanical, physico-chemical, processing and wear properties and uses of this polyacrylonitrile fiber, produced in the form of filaments, staple, and special yarns, are listed.

Dynel.

Carbide & Carbon Chemical Corp. *SVF Fachorgan Textilveredlung 11, No. 1:* 25-28 (1956); *in German.* Through *BCIRA 36:* 208 (1956).

Mechanical, physico-chemical, processing and wear properties of Dynel (60/40% vinyl chloride/acrylonitrile copolymer) are listed, related fibers are enumerated, and the uses of Dynel in mixtures with other fibers are briefly mentioned.

YARN PRODUCTION B

Report of discussions of questions on carding, spinning and warp preparation, 1956.

Textile Operating Executives of Georgia. Atlanta, 1956. 18 p.

Vacuum scavenger systems for spinning mills.

Textile Bull. 82: 80-89 (June, 1956).

Pneumafil systems for the yarn mill, by H. Hocutt, p. 80-82; *Vacuum systems by the Bahnson Co.,* by A. E. Thomas, p. 82-84; *SpinSaVac systems for the yarn mill,* by H. W. Hewitt, p. 84-85; *Panel discussion and questionnaire,* p. 85-89.

Precautions against fire when processing blended fibers.

Wool Record 89: 29-30 (June 7, 1956).

Some notes on Pe-Ce fiber mixtures.

L. Rudolph. *Textil- u. Faserstofftech. 6, No. 1:* 4-10 (1956); *in German.* Through *BCIRA 36:* 211 (1956).

Properties of Pe-Ce (polyvinyl chloride) fibers and spinning of Pe-Ce and Pe-Ce mixtures by the worsted, cotton and woolen systems are discussed, and the favorable effect of Pe-Ce fibers in mixed yarns on the yarn quality, especially as regards its creasing tendency, and uses of Pe-Ce fibers are pointed out. 13 references.

Spinning by cracking develops in the whole world.

J. David. *Industrie Textile:* 33-35 (January, 1956); *in French.* Through *BCIRA 36:* 245 (1956).

The Japanese method and apparatus for producing a spun thread from a bundle of fibers or continuous filaments by the so-called double-drawing process is described. A modified French process is also reported.

Spinning Coloray on the cotton system.

F. D. Benson. *Modern Textiles Mag. 37:* 46-50 (July, 1956).

Practical, detailed instructions for blending, opening and picking, carding, drawing, roving, spinning, twisting and winding Courtaulds' solution-dyed viscose rayon staple.

Overcoming labor shortage in the worsted industry. Part 1. The warping department. Part 2. The twisting department.

Wool Record 89: 38 (April 12, 1956); 34 (May 17, 1956).

Replacement of section warpers with cheese creels and split drum winders by Hattersley warpers with Holt high speed cone winders increased productivity and improved working conditions. Advantages of pre-coning are also cited.

OPENING, PICKING, FIBER PREPARATION B 1

Preparation in two-roller (Vigogne) spinning.

H. D. Notzold. *Textil- u. Faserstofftech. 6, No. 3:* 108-111 (1956); *in German.* Through *BCIRA 36:* 307 (1956).

Improved machinery for opening, cleaning and picking of raw cotton (for higher-grade long-stapled as well as for medium- and low-quality cottons with short staples) is discussed in detail, and reference is also made to the cleaning of wool and cotton waste.

Pneumatic lap control system.

Livingston & Haven, Inc. *Am. Textile Reptr. 70:* 17, 42 (June 7, 1956).

With the long pneumatic system, air pressure can be increased and maintained on both ends of the lap pin and the calender rolls, greater compression results and laps weighing as much as 90 to 110 pounds can be produced easily. Using the system results in fast action and full pressure on the lap pin at start-up. A lap is obtained that can be carded to within four inches of the end, and the usual yard to yard and a half of waste is saved. Other advantages are cited.

Wool oils.

I. K. H. McArthur (Prices (Bromborough) Ltd). *Fibres 17:* 173-177 (June, 1956).

The author discusses the properties required of a good lubricant for wool and considers how these may be determined. The types of lubricants available, together with various lubricant additives are described in relation to the two main systems for the processing of wool, the woolen and the worsted.

Fiber and batch homogeneity and fiber blending in the case of rayon staple.

G. Nitschke. *Textil- u. Faserstofftech. 6, No. 3:* 103-106 (1956); *in German.* Through *BCIRA 36:* 307 (1956).

Experiments are reported to show that any variations in the raw material continue during processing and are difficult to control. Suitable blending methods for rayon staple are pointed out.

CARDING AND COMBING B 2

New constructions of the revolving flat card.

H. Langenstein. *Textil-Praxis, 11 No. 3:* 217-221 (1956); *in German.* Through *BCIRA 36:* 308 (1956).

Attempts to increase the card productivity by introducing changes in the construction of revolving flat cards are discussed, with reference to the card with 244 flats (Fratelli Bettoni), the card with two series of small flats (Societa Marzoli), the Japanese super-carding machine with worker and clearer between the two series of flats, and a mixing card with two workers and clearers and one series of flats.

All-steel card clothing.

K. Buschmann. *Textil-Praxis 11, No. 2:* 116-125 (1956); *in German:* Through *BCIRA 36:* 210 (1956).

The advantages of all-steel card clothing for processing man-made fibers are discussed, with reference to various forms of the card wires.

Drives for fully automatic card sets.

H. Claviez. *Textil-Praxis 11, No. 3:* 214-217 (1956); *in German.* Through *BCIRA 36:* 308 (1956).

Measures for obtaining synchronized running of the motors are discussed, with reference to the performance of a multiple card set.

The T.W. Mark V Noble comb.

Taylor, Wordsworth and Co. Ltd. *Textile Wkly. 56:* 1726-1727 (June 15, 1956); *Textile Merc. 134:* 938-939 (June 15, 1956).

Description of the mechanical features of the new motor-driven Noble combing machine.

DRAWING AND ROVING B 3

The Megaflex high draft ringframe.

Prince-Smith and Stells Ltd. *Textile Mfr. 82:* 246-248 (May, 1956); *Textile Merc. 134:* 795-798 (May 18, 1956).

Operational and constructional details of Model KMF 1 equipped with apron high drafting system for drafts of 10 to 20 and Model KMF 2 equipped with Ambler superdraft system for drafts of up to 175.

Practical experience with Kepa drawing systems.

H. Mutschler. *Textil-Praxis 11, No. 3:* 228-233 (1956); *in German.* Through *BCIRA 36:* 308 (1956).

Directions are given for improving the efficiency of the draw frame by paying special attention to various factors (setting, preliminary drafting, pliability of the upper tapes, covering and position of the rollers, etc.).

SPINNING, WINDING, TWISTING B 4

Super high draft spinning: sliver to yarn.

E. S. Rudnick. *Textile Research J. 26:* 489-494 (June, 1956).

Description of and operating and test data on the OM-S Super High Draft frame. Photographs. Diagrams.

Spinning coarse yarns from drawing sliver.

R. C. Moyer (The Linen Thread Co., Inc.). *Textile Research J. 26:* 485-488 (June, 1956).

The installation of a full-length 200 spindle Gwaltney frame equipped to produce a range of yarns up to 10's direct from drawing sliver is described and the quality of yarns produced is discussed. Photographs.

Are piece-work rates, per hank or per Kg, a rationalization problem in ring-spinning?

R. Buter. *Textil-Praxis 11, No. 2:* 132-133 (1956); *in German.* Through *BCIRA 36:* 238 (1956).

The advantages and disadvantages of piece-work wages, calculated on the basis of yarn weight, are discussed, especially in the case of double-shift plants.

Evaluation of the O.M. Super High Draft Spinning Unit.

F. Holden (New Bedford Institute of Textiles and Technology). *Fibres 17:* 179-180, 184 (June, 1956).

The history of the development of powered equipment for spinning cotton yarns which led up to the construction of the O. M. Super High Draft Spinning Unit is reviewed. A complete description of the innovations of the unit is given and a technical explanation of them made. A detailed comparison between the processing areas of standard equipment and those of the O. M. Spinning Unit are drawn for purposes of evaluation of the mechanical features, the economic aspects, and the quality of the products of both processes of cotton yarn manufacture.

Measuring and counting devices in woolen spinning.

K. Rodehacke. *Spinner u. Weber 74, No. 7:* 265-266 (1956); *in German.* Through *BCIRA 36:* 308 (1956).

A web divider to which a speedometer for rovings and a meter-counting device are fitted, a ring-spinning machine with a counter for the number of revolutions and meter counter for the spun yarn, and a running-time recorder and a stretch-counter for the selfactor are described and illustrated.

Experiments on worsted ring spinning machines with oblique spindle system.

W. Wegener and R. Peuker. *Textil-Praxis 11, No. 3:* 221-227 (1956); *in German.* Through *BCIRA 36:* 309 (1956).

Investigations made on worsted ring-spinning machines with a spindle system inclined by 10° show that this construction causes overinclination of the ring rail, which increases with time and leads to eccentricity between spindle center and ring center. The effect of eccentricity on yarn breakages and on the dynamometric properties of the spun yarn are examined.

Some historical and technical aspects of spinning.

R. A. Rusca and R. S. Brown (Southern Regional Research Laboratory). *Textile Research J. 26:* 460-469 (June, 1956).

A discussion of past, present, and future developments in spinning equipment, with particular reference to drafting systems and ring and traveler limitations, together with a brief presentation of what research and industry are doing to overcome these problems in order to increase production, lower cost, and improve the uniformity of cotton yarns. Diagrams. 30 references.

A note on the fluctuations of tension during unwinding.

D. G. Padfield (Wool Industries Research Assoc.). *J. Textile Inst. 47:* T301-T308 (June, 1956).

The first results of a theoretical investigation of the tensions to be expected during the unwinding of yarn from a cylindrical package are presented and compared with experimental unwinding tensions. The agreement is considered wholly satisfactory in view of the known approximations in the theory, and the variations of mass per unit length, winding angle, traverse length, etc., on the package.

The theory and practice of flax spinning. Part 2. Machinery and equipment. Chapter 15. Winding (continued).

A. V. Pringle. *Textile Quart. 6, No. 1:* 48-53 (1956).

Cylindrical cheese tubes for yarns from chemical fibers. Conical cheese tubes for chemical fiber yarns.

German Standards Committee. *Textil-Praxis 11, No. 1:* 24-26 (1956); *in German.* Through *BCIRA 36:* 212 (1956).

The draft specifications DIN 64 615 and DIN 64 617 give the standard measurements, respectively, of cylindrical and conical cheese tubes and

tube gauges, and describe the material for, and surface characteristics of, the tubes.

YARNS B 5

Theory and practice of blending wool and chemical fibers. Part 1. Strength, elongation at break, and yarn twist during handling of two components.

J. Cirlic and J. Kokojan. *Faserforsch. u. Textiltech. 7, No. 1:* 17-26 (1956); *in German.* Through *BCIRA 36:* 210 (1956).

Relationships between the properties of the fibers and those of the blended yarns (strength, elongation at break and twist) are investigated by using a theoretical triangle which makes it possible to determine the difference between the theoretical and true yarn strength. Mixed yarns from wool and viscose rayon or Silon are examined and factors affecting the properties of the blended yarns are discussed.

The geometry of multi-ply yarns.

L. R. G. Treloar (British Rayon Research Assoc.). *J. Textile Inst. 47:* T348-T368 (June, 1956).

The theory of the geometry of multi-ply yarns is based on the assumption that the individual filament in the ply has the form of a helix wound about a helical axis. The relation between the single yarn twist (before cording) and the twist in the ply (after cording) is dealt with, and is shown to depend on the change in length of ply axis on cording; an explicit expression for the latter quantity is derived. Properties such as yarn retraction, cord retraction, etc., are calculated as average properties for an assembly of coaxial helices, the filaments themselves being taken to be inextensible. Extensive numerical data calculated on the basis of the theory are presented for cord retraction and outside filament angles, as functions of single yarn twist and cord twist, in the case of 2-ply cord. Experimental data show good agreement between calculated and observed yarn and cord retractions. Measurements of filament angles, however, show considerable discrepancies from the theoretical predictions.

Studies on yarn twist.

A. Barella. *Ann. Sci. Textiles Belges No. 4:* 58-88 (1955); *in French.* Through *BCIRA 36:* 225 (1956).

In this review the author discusses the results of investigations on yarn twist, carried out since 1951, under the following headings: distribution of twist in yarn and correlation between twist and fiber diameter; effect of twist on the regularity of yarn and fabric; special twist values (minimum twist for cohesion, optimum twist, and twist at break); effect of twist on the hairiness of yarn; relationship between twist and yarn tension. Some additional information is given in the addendum regarding twist distribution in the yarn, the effect of twist on yarn and fabric regularity and on hairiness of yarn, and continuous measurement of yarn regularity (apparent diameter) by the Vieluba apparatus. 24 references.

Stretch yarn report.

E. Stowell (Universal Winding Co.). *Textile Age 20:* 20-24 (June, 1956).

The fundamental principles in the manufacture of stretch and bulk yarns are examined.

Factors affecting the efficiency of cordage. Final report under Contract N7 onr-421-I.

M. M. Platt. Fabric Research Laboratories, Inc., Boston, Mass., January, 1955. 6 p. Order from Office of Technical Services, Washington 25, D. C. 50 cents. PB 121 044.

The mechanical properties of cordage fibers, the geometry of the cordage structures into which these fibers are placed and the quantitative influence of the effects of such geometry on the mechanical performance of the cordage structure were measured and analyzed. Physical-mathematical analyses were developed which serve a dual purpose: (a) the explanation of the mechanical performance of cordage structures and (b) the quantitative prediction of cordage performance in terms of fiber properties and the structural geometry of the cordage product.

Heat deterioration of tire cords.

S. P. Gundavda (Research Assoc. of British Rubber Mfrs.). *(Letter to the editor). J. Textile Inst. 47:* T298-T299 (May, 1956).

Data on the mean tensile strength of nylon and Terylene tire cords heated in the presence and absence of air indicated that nylon heated in dry air lost about 25% of its strength, whereas that heated in nitrogen lost only 4% of its strength and loss in strength of Terylene heated either in air or in nitrogen was under 4%.

FABRIC PRODUCTION C

Engineering aspects of textile structures.

K. R. Fox (Fabric Research Laboratories, Inc.). *Am. Dyestuff Reptr. 45:* 317-324, 346 (May 21, 1956); *Mech. Eng. 78:* 517-520 (June, 1956).

Analogies are drawn between the similarity of conventional engineering materials and textile

fibers and stress-strain curves are cited as useful parameters in the design of textile structures, e.g. fiber blending and fabrics subjected to multidirectional stresses.

WARPING, SLASHING, YARN PREPARATION C 1

Warp sizing. Part 1. Introduction.

P. V. Seydel (Seydel-Woolley & Co.). *Textile Ind. 120:* 99-106 (May, 1956).

This is the first of a series of articles. It is a revision of the articles which appeared in *Textile Industries* in 1946-49 entitled *Cotton Warp Sizing* and published as a book *Cotton Slashing.* This series will cover the following: the purpose and importance of sizing; a description of the materials to be sized; the sizing materials; testing and analysis of materials; the sizing process (the size mix, equipment, controls, and the operation itself); slashing hints; and the sized material (properties of a well-sized warp, testing and analysis, weaving defects and their remedies).

Warp sizing. Part 2. The material to be sized—cotton.

P. V. Seydel (Seydel-Woolley & Co.). *Textile Ind. 120:* 111-118 (June, 1956).

Physical structure of cotton, mechanical properties, variation in fibers, chemical composition, chemical properties, cotton yarns—effect of their variation on sizing.

Sizing synthetic fiber yarns with polyvinyl alcohol.

Skinner's Silk & Rayon Record 30: 601-603 (June, 1956).

The characteristics of polyvinyl alcohol which make it suitable for sizing synthetic fibers are discussed with particular emphasis on the Elvanols.

Progress in sizing.

H. Gensel. *Spinner u. Weber 73, No. 1:* 32-35 (1956); *in German.* Through *BCIRA 36:* 212 (1956).

Reference is made to various Ortoxin sizes (products of the Farbenfabriken Bayer based on a water-soluble acryl polymerizate) for rayon and synthetic fiber warp yarns.

The sizing of rayon warps.

R. Cantegrit. *Reyon Zellwolle Chemiefasern No. 2:* 94-95 (February, 1956); *in German.* Through *BCIRA 36:* 278 (1956).

Factors which affect the sizing efficiency are discussed, with reference to the viscosity and level of the sizing bath, the manner in which passage of the thread sheet is effected, its velocity, the roller composition, and the pressure applied during squeezing.

Method for pre-determining the yarn length on warper's bobbins.

J. Ernestus. *Textil-Praxis 11, No. 2:* 140-142 (1956); *in German.* Through *BCIRA 36:* 212 (1956).

The method suggested is based on the aim to set cops as large as possible on the creel and to wind as much yarn on the warper's bobbin as is necessary for warping one or more complete warp layers. Thus, the yarn length of one bobbin always corresponds to one warp length or its multiple, plus a small excess. Examples for calculating the yarn length are given.

WEAVING C 2

New 6-shuttle automatic loom.

Ruti Machinery Works Ltd. *Textile Wkly. 56:* 1724-1725 (June 15, 1956).

The Ruti 6-shuttle loom with fully automatic bobbin or pirn changer for four of the shuttles and semi-automatic change (i.e., controlled by the loom itself) for the color in two of the six shuttles is designed to meet fashion changes with ever increasing patterning scope.

High speed ribbon and webbing looms.

Sitam S.r.l. *Skinner's Silk & Rayon Record 30:* 475 (May, 1956); *Textile Wkly. 56:* 1440-1444 (May 18, 1956).

A new range of high speed, automatic, shuttleless ribbon looms are designed as a double weaving unit with two heads, each independent of the other, enabling two ribbons of different structures to be woven on the same machine simultaneously.

Parallel stroke with the fixed picker on the picking stick.

E. Ulrich. *Z. ges. Textil-Ind. 58, No. 5:* 163-165 (1956); *in German.* Through *BCIRA 36:* 279 (1956).

Descriptions and illustrations are given of a fixed leather or plastic picker and various picking sticks (with hinged and swing base, and with pendulum drive).

The temples.

E. O. Hesse. *Spinner u. Weber 74, No. 3:* 103-106 (1956); *in German.* Through *BCIRA 36:* 213 (1956).

In order to facilitate the choice of temples for certain types of cloth, the author briefly surveys the problems associated with temples by discussing the construction of roller, spiked-chain, and horizontal ring temples.

The accuracy of loom setting.

H. Hollstein. *Textil- u. Faserstofftech. 6. No. 3:* 118-119 (1956); *in German.* Through *BCIRA 36:* 310 (1956).

The usual methods for setting loom mechanisms are reviewed and reference is made to the use of model discs.

Variation of the pattern by shed formation.

J. Schneider. *Z. ges. Textil-Ind. 58, No. 5:* 157-163 (1956); *in German.* Through *BCIRA 36:* 279 (1956).

The possibilities of changing the weaving pattern in dependence of the joint automatic interaction of the shed-formation mechanism and weft-change motion are discussed, with reference to the geometry and dynamics of shed formation, types of shed formation, open and closed shedding, elongation of the warp threads during opening of the shed, friction of the warp in the heddle eye, negative and positive heddle motions, arrangement of the dividing rods and lease bars in the back part of the shed, the time of the shed change, and the results of premature or retarded shed formation.

Warp tension and beating-up motion: effect on the weft density.

J. Schneider. *Rayonne et Fibres Synthet. 12, No. 2:* 179-190 (1956); *in French. Reyon Zellwolle Chemiefasern No. 3:* 174-181 (1956); *in German.* Through *BCIRA 36:* 310 (1956).

Factors causing difficulties in the manufacture of heavy fabrics are discussed under the following headings: maximum weft density and yarn diameter; weft density and warp tension; warp-tension compensation and oscillation of the back-rest; cramming of warp and weft threads; rocking movement during beating-up and shed formation.

Yarn tension measurements on weaving shuttles.

K. Malz. *Z. ges. Textil-Ind. 58, No. 7:* 237-240 (1956); *in German.* Through *BCIRA 36:* 310 (1956).

Tight weft threads in the fabric are often caused by high yarn tensions occurring during weft insertion in the open shed. The apparatus described (Elma-feeler), consisting of a measuring head, amplifier and recording device and movable on a carriage, makes it possible to measure these tensions by means of an electromagnetic feeler. Its use is demonstrated by examples.

The position of the cloth fell in power looms. Part 1. Stable weaving conditions. Part 2. Disturbed weaving conditions. Part. 3. Experimental.

K. Greenwood, W. T. Cowhig, and G. N. Vaughan. *J. Textile Inst. 47:* T241-T286 (May, 1956).

The work described in these papers forms part of an investigation into the problem of irregular pickspacing after a loom stoppage. Part 1 covers the theoretical analysis of the factors governing pickspacing. Mathematical expressions relating the rate of take-up to the position of the cloth fell and the latter to pickspacing are developed for both bumping and non-bumping conditions. Some features of the warp tension cycle are discussed and it is shown how the work done in beating up the new pick can be calculated. Part 2 presents a mathematical analysis of various causes of irregular pickspacing with special reference to the effect of warp and fabric relaxation on the position of the cloth fell and pickspacing. The effect of the free length of warp and fabric and the effect of different types of let-off motion are discussed. Part 3 describes a method for measuring accurately the position of the cloth fell on a loom. The results of such measurements are correlated with measurements of pickspacing in the fabric and are discussed in the light of theory developed in Parts 1 and 2. The relation between beat-up force and pickspacing is illustrated by means of a static weaving model. 15 figures. 16 references.

Double warp weaving.

C. Merlin. *Industrie Textile:* 113-118 (February, 1956); *in French.* Through *BCIRA 36:* 279 (1956).

A detailed description is given of the method consisting in weaving simultaneously two superposed warps joined only near their edges. Drawing-in the warp threads, loom drive, and passage of the weft are described and illustrated.

Jute and linen weaving. Part 3. Loom auxiliary motions. Chapter 1. Warp protector motions (continued). Chapter 2. Weft-fork motions.

W. Haggan. *Textile Quart. 6, No. 1:* 37-42 (1956).

Chenille carpets.

C. Labriffe. *Industrie Textile:* 123-128 (February, 1956); *in French.* Through *BCIRA 36:* 279 (1956).

Weaving of chenille carpets is described and reference is made to imitation knotted carpets, hair carpets and carpets with Axminster weave.

The technology of net curtain weaving.

A. Morgner. *Textil- u. Faserstofftech. 5, No. 10:* 558-560 (1955); *6, No. 1:* 38-41

(1956); *in German.* Through *BCIRA 36:* 213 (1956).

The weaving technique and the most important weave types used, as well as the development of weave diagrams, are described.

KNITTING C 3

Comparison of the stretching, elongation and elasticity properties of Perlon stockings with those of the single threads taken from them.

W. Wegener and D. Stockmann. *Reyon Zellwolle Chemiefasern No. 2:* 98-106 (February, 1956); *in German.* Summary in *BCIRA 36:* 294 (1956).

How to knit Agilon stretch yarn in women's hosiery.

C. G. Evans (Deering Milliken Research Corp.). *Textile Age 20:* 48-50 (June, 1956).

FNF super warp knitting machine.

F.N.F. Ltd. *Textile Wkly. 56:* 1723, 1725 (June 15, 1956).

The 84-inch Super model which maintains a continuous cruising speed of 1,250 courses per minute differs from the standard machine in several design features, but as with the standard machine, runs on both pattern wheels and chains, allowing exactly the same patterning possibilities.

Patterning capacity of three-bar warp knitting machines.

J. Rab. *Skinner's Silk & Rayon Record 30:* 604-606, 609 (June, 1956).

It is pointed out that with the demand for elaborately patterned fabrics the value of a three-bar machine lies not merely in its capacity for producing complex designs, but in an increased scope for producing better-quality fabrics. Illustrations of patterns are included.

High-speed production of fleecy fabrics: the Supreme model TIF.

J. Rab. *Hosiery Trade J. 63:* 100-101 (June, 1956).

A description of the machine is preceded by a discussion of the construction of fleece fabrics and the types of machines used in their manufacture.

The Milan Fair knitting section.

J. Rab. *Hosiery Times 29:* 39-44 (June, 1956).

FABRICS C 4

Blending and fabric performance. Part 2. Dacron-Orlon, Orlon-rayon. Part 3. What nylon does.

J. F. Sayre. *Modern Textiles Mag. 37:* 58, 62-63 (May, 1956); 42-43 (June, 1956).

Graphical presentation of dimensional stability to laundering, press retention, wrinkle resistance, crease recovery, abrasion resistance, flammability and static resistance of Dacron-Orlon and Orlon-rayon blends of varying compositions and of nylon blended with acetate, rayon or Orlon.

Causes of non-uniform fabrics.

E. O. Hesse. *Spinner u. Weber 74, No. 7:* 267-268 (1956); *in German.* Through *BCIRA 36:* 324 (1956).

Causes of uneven cloth density are investigated, with reference to the take-up motion, let-off motion, warp beam, reed, shed, lay, back rest, temples, structure of the warp and condition of the material (wet weft yarn).

Warp pile fabrics.

G. Capron. *Teintex 21, No. 2:* 108-125; *No. 3:* 205-217 (1956); *in French.* Through *BCIRA 36:* 310 (1956).

In this review, the author discusses first the history, generalities and constitution of various types of warp pile fabrics and, in the second part, bleaching, dyeing and printing of the products.

More about crepe weaves.

D. C. Snowden. *Man-Made Textiles 33:* 57-58 (June, 1956).

Brief description of the more useful methods for producing crepe weaves.

Design in woven structure. Part 41. Analysis of color-and-weave. Part 42. Honeycomb weaves. Part 43. Grecian and Brighton honeycombs.

D. C. Snowden. *Wool Rev. 27:* 33-35 (April, 1956); 29-30 (May, 1956); 39 (June, 1956).

Woven fabric structure. Part 2. Stitched ribs, twills and hopsacks: counts and sett. Part 3. New designs from stabilized long-float weaves.

D. C. Snowden. *Man-Made Textiles 32:* 44-47 (April, 1956); 42-45 (May, 1956).

In the first two articles the author developed the principles of fabric construction for stabilized long-float weaves. The third article suggests how these principles can be deliberately modified to produce distinctive color and weave effects.

The structure phases of fabrics.

N. Scherbina. *Faserforsch. u. Textiltech. 7, No. 1:* 38-41 (1956); *in German.* Through *BCIRA 36:* 226 (1956).

The term structure phase, which characterizes the geometrical structure of a fabric in dependence of warp- and weft-thread diameter, cloth thickness, and, respectively, horizontal and vertical distance between warp- and weft-thread centers, is explained on a linen-weave fabric with warp and weft threads of the same diameter, taking into account the deformation of the fiber cross-section. A schematic cross-section is given of the nine structure phases of this fabric.

Effects on fabrics of atomic test explosion.

H. W. Stiegler. *Modern Textiles Mag. 37:* 82-83, 85 (April, 1956).

Brief report on twenty types of fabrics exposed during test atomic explosion in Nevada, May, 1955, including natural and synthetic fibers available on the market. A complete report will be published at a later date by the Atomic Energy Commission.

Clothing and climate. Part 2.

K. W. L. Kenchington. *Texture 3:* 47-52 (June, 1956).

An examination of the fabric properties that have greatest effect on the efficiency and comfort of the wearer e.g. thermal insulation, compressional resilience, moisture relationships, and air permeability. 27 references.

Wear and tear of underwear and its durability.

H. Bohringer. *Faserforsch. u. Textiltech. 7, No. 1:* 27-38 (1956); *in German.* Through *BCIRA 36:* 227 (1956).

The economical importance of careful washing and various factors causing premature wear and tear are discussed, with reference to the raw material, yarn count and twist, weave and thread density, finishing agents, choice of detergents, washing process, bleaching, and construction of washing machines. Preliminary results of wear tests are discussed, in which factors reducing the wear value and durability of underwear (wearing and washing) were quantitatively separated, taking into account the effect of time elapsing between wearing and washing.

Filtration, filters, and filter-media.

B. H. Refson. *Chem. Prod. 18, No. 11:* 411-414; *No. 12:* 467-471 (1955); *19, No. 1:* 17-20 (1956). Through *BCIRA 36:* 228 (1956).

The first article deals with the fundamental principles of filtration and the second and third articles cover the uses and characteristics of filters made from woven fabrics or loose masses of fibers (both natural and man-made).

FINISHING AND CHEMICAL PROCESSING D

Thermofixing and dyeing of polyamide fabrics.

W. Muller. *Spinner u. Weber 74, No. 6:* 230-233 (1956); *in German.* Through *BCIRA 36:* 282 (1956).

A general survey is made of laundering, bleaching, thermofixing and dyeing of Perlon L and nylon. In addition to the review of technological and chemical properties of polyamides, the reaction between the respective assistant or dye and the fiber is explained on the basis of the chemical constitution of the two components. The advantages and disadvantages of finishing processes are discussed and reference is made to the fastness properties of various dye groups. Dyeing directions are given.

Standard methods for the removal of added matter from textiles.

J. Textile Inst. 47: P374-P379 (May, 1956).

Tentative Textile Standard No. 26, 1956 (Revision). The methods described in this standard are effective for removing processing aids such as lubricants and sizes (but excludes jute batching oils), dyes and finishes, whether applied as a surface coating or formed within the fiber.

CHEMICAL PROCESSES D 1

A method for determining the bleaching action of hydrogen peroxide and peroxide-containing detergent.

R. Weber. *Textil- u. Faserstofftech. 6, No. 1:* 29-31 (1956); *in German.* Through *BCIRA 36:* 214 (1956).

The necessity of determining the bleaching effect quantitatively is pointed out and a method for determining the bleaching action of hydrogen peroxide and peroxide-containing detergents is described. The effect of copper ions on the hydrogen-peroxide decomposition is also examined.

Determination of caustic and silicate content in peroxide bleaching baths.

N. J. Faasen and F. L. J. van Lamoen. *Tex 15, No. 2:* 188-191 (1956); *in Dutch.* Through *BCIRA 36:* 312 (1956).

The rapid volumetric method described is based on the formation of potassium fluosilicate from silica, sodium fluoride and potassium chloride. Calcium, magnesium, and iron ions do not interfere in the determination, but the sodium hydroxide content cannot be determined accurately in the presence of Calgon.

Theoretical aspects of cotton bleaching with hypochlorites.

L. Morel and M. Danniere. *Industrie Textile:* 933-936 (December, 1955); 133-136 (February, 1956); *in French.* Through *BCIRA 36:* 281 (1956).

Literature on this subject is reviewed and it is concluded that, for bleaching cotton under optimum conditions, it is necessary, before bleaching: to determine accurately the hypochlorite concentration and check the active-chlorine content, alkalinity and temperature; during bleaching: to control at regular intervals the consumption of hypochlorite and the alkalinity of the bleaching bath; after bleaching: to rinse thoroughly and to remove any chlorine residues before acidification.

The wear value reduction of cotton textile material with initial chemical degradation.

J. Jensen. *Tidsskr. Textiltek. 14, No. 1:* 1-6; *No. 3:* 41-45 (1956); *in Danish.* Through *BCIRA 36:* 324 (1956).

The wear properties and chemical structure of cotton fibers and their degradation during bleaching are discussed, and viscosity and fluidity measurements are described. The results obtained by examining 140 randomly selected bleached goods (Danish and foreign) are divided into two groups, with fluidities above and below 10. Reference is made to the economic importance of the problem; savings resulting from non-degradative bleaching are estimated.

The oxidation of cotton yarn by periodate under mechanical conditions that oppose swelling.

T. P. Nevell. *J. Textile Inst. 47:* T287-T297 (May, 1956).

The effect of preventing a cotton yarn from shrinking during its oxidation by sodium metaperiodate was investigated. It was found that, owing to the great swelling produced in the cotton fibers during the later stages of periodate oxidation, a high tension develops in the yarn prevented from shrinking, and a yarn of much more compact structure is produced. The yarn oxidized under tension is stronger than the yarn oxidized to a similar extent but free to shrink. The effect of preventing yarn shrinkage during oxidation on other properties of the yarn and the effect of mercerizing the yarn prior to oxidation also was studied. Graphs. 7 references.

The significance of transitory swelling during alkali treatment of cotton.

K. Messik and K. Szabo. *Faserforsch. u. Textiltech. 7, No. 2:* 89-93 (1956); *in German.* Through *BCIRA 36:* 281 (1956).

Investigations into the dye absorption of cotton, treated with alkali and subsequently rinsed with cold or hot water, show the effect of the transitory swelling on the degree of cellulose swelling. The increased volume of the amorphous portion due to the transitory swelling is directly related to the concentration of the lye; this explains, in some measure, the effect of the lye concentration on the dyeability of cotton. The transitory swelling can be to some extent eliminated by rinsing the cellulose with non-swelling liquids, e.g. alcohol. The transitory swelling leaves, especially with respect to reactivity, permanent traces in the cellulose structure and can be regarded as a transitory phenomenon only with regard to certain properties, e.g. volume increase.

The effect of laundering, mercerizing, and simulated vat dyeing on the properties of partially cyanoethylated cotton.

R. M. Reinhardt, A. R. Markezich, H. B. Moore, and J. D. Reid (Southern Regional Research Laboratory). *Textile Research J. 26:* 423-429 (June, 1956).

Cotton sheeting cyanoethylated to various nitrogen contents, from 2.2 to 6.4%, was subjected to laundering, mercerizing, or simulated vat dyeing. The samples were then analyzed for thread count, weight, and thickness and tested for breaking strength, elongation, tearing strength, abrasion resistance, air permeability, stiffness, moisture regain, heat resistance, and rot resistance. In addition, wrinkle recovery of the partially cyanoethylated and untreated cloth was determined. Results indicate that none of the treatments seriously affects the usual textile properties of partially cyanoethylated cotton. The rot resistance and heat resistance of samples of more than 4% nitrogen content were not greatly impaired; however, a sample of 3.2% N was not rot-resistent after these subsequent treatments. 9 references.

Wash-and-wear cottons.

E. Abrams. *Bull. Southern Research Inst. 9, No. 1:* 7-8, 13 (1956).

The SRI process for wash and wear cottons uses a urea-formaldehyde-to-thermoplastic resin ratio of 30 to 70 and gives outstanding physical properties.

Getting your money's worth of wrinkle recovery.

S. H. Foster. *Textile Bull. 82:* 97-100 (June, 1956).

Discussion of the effects of cure temperature, cure time and amount of catalyst in resin treating cotton fabrics for wrinkle resistance.

The use of tri- and hexamethylol melamine for creaseproofing of spun rayon fabrics, and their advantages as compared with dimethylol urea.

F. Kocevar and B. Pregrad. *Reyon Zellwolle Chemiefasern No. 2:* 88-93 (February, 1956); *in German.* Through *BCIRA 36:* 285 (1956).

The stability of aqueous solutions of tri- and hexamethylol melamine, with and without addition of various catalysts, is examined, and the effects of the amount of melamine resin fixed, temperature and duration of the polycondensation, amount and type of the used catalyst, and addition of plasticizers on the crease-resistance, tensile strength, elongation, and abrasion resistance of the impregnated spun-rayon fabrics are determined. The main advantages of the melamine resins are their greater strength as compared with urea resins, and the improved crease- and abrasion-resistance of the finished fabric.

Development of an improved fungicidal vinyl coating for cotton fabrics.

R. R. Heitkamp, W. J. Dewar and D. D. Eichorn. Flexfirm Products, El Monte, Calif., August, 1954. 46 p. Graphs. Tables. Order from Office of Technical Services, Washington 25, D. C. $1.25. PB 121 020.

Secondary plasticizers and extenders were evaluated for their ability to impart fungistatic properties when incorporated into vinyl coatings and applied to cotton fabrics. The evaluations were carried out by determining the tensile strength of coated fabric samples before and after two weeks soil burial. Only dehydroabietylammonium pentachlorophenoxide satisfied all requirements in providing the protection from microbial attack and at the same time giving the vinyl formulator the utmost leeway in producing an unlimited color range in waterproof coatings.

Practical experience with a new adhesive during flocking of textiles.

P. Weber. *Textil- u. Faserstofftech. 6, No. 3:* 129-130 (1956); *in German.* Through *BCIRA 36:* 314 (1956).

The use of cross-linked polyurethanes as adhesive for flock-printing and surface-flocking of textiles from vegetable and synthetic fibers is discussed. The adhesive consists of Impranil FLD and Imprafix TH (catalyst).

Use of silicones in the textile industry.

R. A. Ford (Dow Corning Corp.). *Am. Dyestuff Reptr. 45:* P377-P380 (June 4, 1956).

In a discussion of some of the chemical and physical properties of the silicones when used as textile finishes, the commercial development of the silicones for use as finishes for upholstery and wool fabrics are especially emphasized. A silicone process for producing shrink-resistant wool fabrics is also described. Advantages claimed are ease of application and unimpaired physical properties of the treated fabrics.

Waterproofing in the finishing laboratory.

R. Gunther. *Z. ges. Textil-Ind. 58, No. 5:* 176-177 (1956); *in German.* Through *BCIRA 36:* 285 (1956).

The author gives compositions for (1) waterproofing of viscose and acetate rayon with (a) linseed oil in a solvent, or (b) paraffin-alumina emulsion; (2) permanently waterproofing of rayon and cotton by (a) the Rotal process (Rotal base), and (b) with Primenit VS (Hoechst product).

DYEING AND PRINTING D 2

Dyeing of Perlon in mixtures with other textiles.

G. Fruh. *Reyon Zellwolle Chemiefasern No. 1:* 44-47 (1956); *in German.* Through *BCIRA 36:* 216 (1956).

Some advice is given on dyeing mixtures of Perlon (continuous filament and staple fibers) with vegetable fibers (cotton, viscose rayon, cuprammonium rayon, and rayon staple), wool, silk, and cellulose acetate, respectively.

Fast shades on wool.

W. Beal (Geigy Co. Ltd). *Dyer 115:* 934-938 (June 8, 1956).

Practical considerations in obtaining levelness with dyes requiring no aftertreatment process, e.g. the weakly acid, Polar and Irgalan types of dye (and to some extent, the metachrome dyestuffs), and dyes requiring an aftertreatment process, e.g. the Eriochrome dyes and solubilized vat dyes.

Factors influencing the successful application of direct dyes.

E. M. Taylor (General Dyestuff Co.). *Am. Dyestuff Reptr. 45:* P381-P384 (June 4, 1956).

A brief outline of the theory of dyeing cellulosic fibers with direct colors is presented and the important part that common salt plays in direct color dyeing is explained. Factors that the dyer must consider in practical application with respect to rate of absorption and dyeing behavior are discussed. The effect of temperature, liquor ratio, circulation and the presence of electrolytes is given. Classification of direct dyes into classes A, B, and C, according to dyeing behavior and an indication of how to handle each class is explained. The reduction of direct dyes and the effect of hard

water in relation to dyeing behavior is discussed. Emphasis is placed on proper dyestuffs selection as related to fastness and dyeing properties.

Dyeing with Coprantin dyes on machines made of iron.

W. Schon. *Textil- u. Faserstofftech. 6, No. 1:* 24-26 (1956); *in German.* Through *BCIRA 36:* 217 (1956).

Experiments showed that dyeing with Coprantin dyes can be carried out in iron equipment without impairment of the fastness properties and with only slight changes of the color tints. The excellent fastness properties of Coprantin dyes make it possible to use them in cases in which hitherto only vat dyes could be used.

Levelness: the principal demand in dyeing.

H. Hansen and H. G. Buddicker-Lons. *Textil-Praxis 9:* 470-473 (1954); *in German.* Translation in *Textile J. Australia 30:* 1303-1307 (January 20, 1956).

The conditions for achieving level dyeings with cold, warm and hot dyes, as well as the causes and methods of avoiding streaky dyeings with rayon and staple fiber fabrics are discussed.

Dunn system efficiency in the hosiery dye house.

H. White (Lee Hosiery Finishers, Inc.). *Hosiery Underwear Rev. 39:* 93, 101 (June, 1956).

Precautions to be taken in presetting and boarding in the Dunn system as well as dyeing procedures for 15 denier nylons are discussed.

Soaping vat dyeings.

Ciba Rev. No. 114: 33-36 (April, 1956).

Discussion of the factors vital to the effectiveness of the soaping process (temperature, time, type and concentration of dispersing agent) and soaping in circulating-liquor machines, jigs and winches, and by continuous methods are discussed, and a table giving the behavior of Ciba and Cibanone dyes during soaping is included.

The control of sodium hydrosulfite in vat dyebaths.

W. J. Marshall (Imperial Chemical Industries Ltd). *J. Soc. Dyers Colourists 72:* 201-210 (May, 1956).

The rate of oxidation of hydrosulfite solutions has been measured over a wide range of conditions, and the results have been related to typical practical systems. The reduction properties of vat dyes are discussed with reference to their reduction potentials, and it is shown that electrometric methods can be satisfactorily applied to dyebath control only in special circumstances due to the insensitivity of the electrode to changes in hydrosulfite concentration and the variable speed with which a steady potential is reached. Therefore, the most satisfactory method of control depends on an initial quantitative study and thorough understanding of the hydrosulfite requirements of the dyeing system. Methods of measuring hydrosulfite concentration suitable for dyehouse use are briefly described. 20 references.

Dyeing at high temperatures in machines with circulating liquor.

B. Steverlynck. *Textil-Praxis 11, No. 2:* 155-160 (1956); *in German.* Through *BCIRA 36:* 217 (1956).

Detailed reference is made to the Steverlynck static-pressure dyeing machine and the Drijvers-Steverlynck dyeing process which makes it possible to use less-soluble dyes which cannot be employed in other machines.

Contribution to automatic control of dyeing processes in dyeing machines.

H. Andre. *Textil-Praxis 11, No. 2:* 171-172 (1956); *in German.* Through *BCIRA 36:* 217 (1956).

A general survey is made of the rationalization problems in job dyeing with the purpose of suggesting improvements in the control of various dyeing stages.

The study of the phenomena of diffusion and adsorption of direct dyes in viscose fibers by the method of differential dyeing. Part 1.

N. Iwanow and R. Schneider (Centre de Recherches Textiles de Mulhouse). *Textile Research J. 26:* 407-422 (June, 1956).

This study on the kinetics of penetration of direct dyes into the core of viscose fibers by differential dyeing has been made by a new method, described in detail and characterized by the use of a special microcell and of one and the same piece of fiber for a large number of repeated dyeings. Results on the influence of the concentration in salt, the concentration in dye, and of the nature of the dyes on the diffusion of the latter: the migration of the dyes; and the diffusion of dyes in pre-dyed viscose fibers are given. 9 references.

Metallizable and metallized dyes continuously enrich the modern dyeing technique.

C. H. Fischer-Bobsien. *Z. ges. Textil-Ind. 58, No. 5:* 168-173 (1956); *in German.* Through *BCIRA 36:* 283 (1956).

In conclusion of the previous articles the author discusses metal-complex dyes suitable for dyeing union cloth, polyamides, polyvinyl chloride fibers and polyamide/wool mixtures. A table

listing commercially available metallizable and pre-metallized dyes is given. 19 references.

The dispersing of insoluble dyestuff powders.

W. J. Marshall. *Hexagon Digest No. 23:* 22-25 (March, 1956).

In addition to the usual procedures for preparing aqueous dispersions, an apparatus is described for dispersing and sieving FD Powder Fine brands of vat dyestuffs, Dispersol and Duranol Powders.

Polarographic investigation of fur dyes and their oxidation products.

G. Sandberg. *J. Soc. Dyers Colourists 72:* 227-238 (May, 1956).

Results on the effect of pH on the oxidation of p-phenylenediamine indicated that even small fluctuations in pH have an intricate effect on the diffusion properties of this oxidation product, and therefore also on fur dyeing. The polarography of some other common fur dyes, all of which are aromatic nitro derivatives, was also examined. Polarography together with spectrophotometry and vertical paper electrophoresis was the technique generally adopted in this work. 18 references.

Color matching in artificial light.

F. Tanner. *Spinner u. Weber 74, No. 3:* 107-110 (1956); *in German.* Through *BCIRA 36:* 220 (1956).

The use of daylight and artificial light for color-matching purposes is discussed, with reference to the requirements as regards light composition, classification of raw cotton in dependence of the light source, testing apparatus for color matching in the textile industry (properties, costs, field of view, internal and external field, interferences and color perception in the external field) and standardization problems.

Improvement of colorfastness properties on United States Air Force fabrics.

R. J. Peirent, R. E. Derby, Jr. and G. O. Langlais. Lowell Technological Institute Research Foundation, February, 1956. 70 p. Diagrams. Graphs. Tables. Order from Office of Technical Services, Washington 25, D. C. $1.75. PB 121 051.

Dye formulae to provide improved colorfastness on wool serge and gabardine, satin nylon and rayon nylon fabrics were developed. The development of the dye formulae, the problems encountered in establishing them properly in fabric manufacture, and the test measurements of the properties of the fabrics produced are presented.

Methods for improving the wet-fastness of substantive dyeings, with special reference to the aftertreatment with cationic products.

H. G. Buddicker-Lons. *Z. ges. Textil-Ind. 58, No. 3:* 93-97 (1956); *in German.* Through *BCIRA 36:* 215 (1956).

The after-treatment methods used for improving the wet-, wash-, perspiration-, and ironing-fastness of substantive dyes are reviewed, with special reference to (1) after-treatment methods whose action is based on enlargement of the dye molecule (treatment with formaldehyde, diazotization and developing) and (2) wet-fastness improvement by (a) treatment with metal salts and (b) the use of cationic products.

Regarding the fastness to light of direct dyestuffs with special consideration to Sirius Supra dyestuffs.

H. Hansen and H. G. Buddicker-Lons. *Textil-Praxis 9, No. 10:* 958-960 (1954); *in German.* Translation in *Textile J. Australia 30:* 1492-1495 (February 20, 1956).

See *TTD 12:* 210 (1955).

Direct printing with vat dyes by the Rongalite C potash process.

G. Bernardy. *Melliand Textilber. 36, No. 11:* 1151-1159; *No. 12:* 1287-1290 (1955); *37, No. 2:* 189-197 (1956); *in German.* Through *BCIRA 36:* 217 (1956).

Methods for direct printing with vat dyes are briefly reviewed and a detailed description is given of the sodium formaldehyde sulfoxylate-alkali carbonate process which has found wide application in printing plants. Although the process can be slightly modified, according to requirements, by using potash and/or soda as the alkali, it is generally known as the Rongalite C-potash process.

Printing of polyacrylonitrile fibers with vat dyes.

K. Schmidt. *Spinner u. Weber 74, No. 2:* 73-75 (1956); *in German.* Through *BCIRA 36:* 218 (1956).

Since polyacrylonitrile fibers are somewhat sensitive to alkali, processes in which potash or soda comes in contact with the fibers (as in printing with vat dyes) were expected to cause tendering of the fiber during storing and steaming. It was found, however, that this damage is insignificant and that only the presence of certain swelling agents, used to improve fixation, causes some weakening of the fiber (not exceeding 10%). Laboratory experiments have shown that the use of vat dyes for printing polyacrylonitrile fibers

gives good results and that the dyes, owing to their satisfactory fastness properties and relatively good exhaustion, fulfil technically and economically all conditions required for a print on high-quality fabrics.

Printing of polyacrylonitrile fibers by the Sandocryl process.

E. Metzger. *Teintex 21, No. 1:* 13-15 (1956); *in French.* Through *BCIRA 36:* 218 (1956).

Experiments have shown that the Sandocryl dyeing process can also be used in printing by incorporating into the printing paste Sandozcopper (cuprous oxide) and an acid-liberating agent (ammonium tartrate or phosphate). After vaporization, the liberated acid breaks down the cuprous oxide into metallic copper and bivalent copper ions. The finely precipitated metallic copper forms with the bivalent copper a redox system which supplies the copper ions necessary for the fixation of the dye. The reactions are the same as in the dye-bath composed on the Sandocryl principle. Advantages and application of the printing process are discussed.

Alcian X dyestuffs in cotton printing.

W. Clarke. *Hexagon Digest No. 23:* 12-21 (March, 1956).

The article covers the technique of printing with Alcian X dyes, their use with other dyes, printing recipes and processing after printing (steaming, fixing and soaping).

The use of Monyl, melamine and polyvinyl alcohol in screen printing.

R. Kunzl. *Textil-Praxis 11, No. 2:* 179-181 (1956); *in German.* Through *BCIRA 36:* 218 (1956).

The use and advantages of polyvinyl alcohol as photosensitive layer (in place of gelatin), of melamine lacquers, and of Monyl (nylon) gauze for the preparation of stencils are discussed.

Some notes on the present state of screen printing.

R. W. Hauri. *SVF Fachorgan Textilveredlung 11, No. 1:* 2-9 (1956); *in German.* Through *BCIRA 36:* 218 (1956).

A review is made of the possibilities of screen printing on cellulose fibers and of the dye classes available for this purpose: vat dyes; Indigosols; insoluble azo dyes; oxidation dyes; substantive dyes; acid dyes; sulfur, pigment, and pthalocyanine dyes. 13 references.

Production wages in screen printing.

R. Neumann. *Textil-Praxis 11, No. 2:* 173-174 (1956); *in German.* Through *BCIRA 36:* 238 (1956).

A practical example is given for the calculation of printers' production wages based on the time required for printing, changing the stencils and colors and changing the material, taking into account unproductive time and interruption of work for various reasons.

MECHANICAL PROCESSES D 3

A new process for compacting textile materials. Part 1. Research and development. Part 2. Industrial applications.

W. J. Hamburger and K. R. Fox (Fabric Research Laboratories, Inc.). *Textile Research J. 26:* 441-454 (June, 1956).

Part 1 gives theoretical consideration to the mechanism of shrinkage in a textile fabric and what must be done to render a fabric stable to subsequent washing. A mechanical process is described which has been found useful in compacting fabrics of a wide range of weights and fiber contents. Part 2 shows how the Riggs and Lombard compacting machine was developed to the point of actual plant installations, describes how these machines can be used in conjunction with other standard textile processing equipment, presents some of the data that has been accumulated on a wide range of fabrics, and points out the universality of the machine by citing a number of special applications. Photographs. Diagrams. 12 references.

Yarn and fabric shrinkage control possible with new compacting machine.

Riggs & Lombard, Inc. *Textile Age 20:* 52-55 (June, 1956).

Operation and installation of a mechanical process stabilizing fabric against shrinkage over a wide range of weights, weaves and fiber contents. Diagram.

The heat-setting of warpknit Enkalon.

J. Andriessen. *Enka Breda Rayon Rev. 10:* 37-52 (April, 1956).

A discussion of the necessity for heat-setting and the evaluation of the heat-setting effect is followed by a description of heat-setting by the hot air system on a Daglish stenter and by saturated steam in an autoclave as based on manufacturing experience. Photographs. Tables. Graphs. 16 references.

DRYING D 4

New theories on the drying of fabrics.

H. Vits. *Tinctoria 53, No. 1:* 3-14 (1956); *in Italian.* Through *BCIRA 36:* 219 (1956).

With reference to the drying and tentering machine of the Metalmeccanica S.r.l. (Busto Assizio), a table is given for determining the condition of the air-vapor mixture in the drier, and the development and use of the table are described. With the aid of the usual temperature-measuring instruments (psychrometers) and with this table, it is possible to determine all technologically important drying values including the temperature of the fabric, the latter being useful in the solution of drying problems associated with production, economy, and quality of the finished product.

Drying by infra-red radiation generated by electro-conductive glass.

E. Plumat and E. Deliere. *Ind. Chim. Belge 20:* 961-971 (1955); *in French.* Through *BCIRA 36:* 219 (1956).

Glass is an ideal radiator for long infra-red radiation, giving a high yield and very low convection losses. The spectral composition of the emitted radiation must be adapted to the spectral absorption of the substance subjected to heating. The application of radiating panels for drying textiles, paints, etc., is discussed.

TESTING AND MEASUREMENT E

Studies in textile testing.

N. R. Garner. *Ind. Quality Control 12:* 44-46 (May, 1956).

Evaluation of tensile tests, hydrostatic pressure tests and dynamic absorption tests for sources of variation by means of the analysis of variance technique.

A new abrasion resistance tester (friction pulsator) and its use.

W. Bobeth. *Faserforsch. u. Textiltech. 7, No.* 2: 63-73 (1956); *in German.* Through *BCIRA 36:* 292 (1956).

A longitudinal abrasion tester is described, which operates optionally under almost constant or alternating tensile stress. Liquid and air can be supplied and dust removed in the course of the testing procedure. There are several special abrasion heads to test fatigue on cord yarns, partial abrasion on fabric strips, edge abrasion, abrasion on knitted goods, etc. The abrasives used include emery paper, sintered corundum, etc. Application of the tester to fabrics from spun rayon/Perlon mixtures and woolen suiting is discussed.

Technique for making surface replicas from comparatively small objects.

I-M. Feng (Bendix Aviation Corp.). *J. Appl. Phys. 27:* 472-473 (May, 1956).

The method involves making collodion or Formvar surface replicas directly from fine fibers with the conventional Scotch tape stripping technique. The only extra step is to imbed the fine fiber in a piece of thermoplastic in such a way that a small exposed portion of the fiber is even with the surface of the thermoplastic.

Simplified method for the preparation of fiber cross-sections.

H. M. Holz. *Reyon Zellwolle Chemiefasern No. 1:* 49-50 (1956); *in German.* Through *BCIRA 36:* 220 (1956).

The method described is a modification of the known Herzog-Viviani method. For the preparation of fiber cross-sections, small corks (20-25 mm high), a suitable drilling needle, a strong thread (Perlon), a sharp thin razor blade and some paraffin mixed, preferably, with about 5% beeswax to increase its pliability, are required. The thread is drawn through the hole drilled in the cork so that it forms a loop at the end, by means of which a parallelized bundle of the fibers to be examined, saturated with the melted paraffin, is drawn through the cork (in a quantity filling the whole bore hole). The thread is then removed and very thin sections are cut with the razor blade. The method is relatively simple and rapid.

Infra-red microspectroscopic study of orientation in fibers.

R. G. Quynn. Textile Research Institute, Princeton, N. J., February, 1955. 146 p. Photos. Diagrams. Graphs. Tables. Order from Library of Congress, Washington 25, D. C. Microfilm $7.20. Photocopy $22.80. PB 119 979.

A reflecting microscope has been designed and constructed for use in conjunction with a Perkin-Elmer infrared spectrometer. Details are given of the design, construction, and performance of the microscope-spectrometer combination with fibers and a single crystal.

The heating stage microscope in the textile laboratory.

W. Kunze. *Reyon Zellwolle Chemiefasern No. 3:* 169-172 (1956); *in German.* Through *BCIRA 36:* 320 (1956).

An attempt is made to show the potential uses of a heating-stage microscope in the textile laboratory, and to prove by photomicrographs that valuable observations can be made during examination of chemical assistants, dyes (in substance and on the fiber), etc. Directions for the use of the microscope are given.

Optical instruments in textile research.

SVF Fachorgan Textilveredlung 10, No. 12: 632-675 (1955); *in German.* Through *BCIRA 36:* 220 (1956).

The following papers were presented at the autumn session of the SVF in September, 1955, in Zurich: *What is required of a good microscope,* by W. Gattiker 632-640; *Micro-phase contrast in textile testing and research,* by H. Reumuth 640-646; *Principles of measuring wool fineness,* by H. Reinhardt 646-651; *Optical instruments in the textile industry,* by N. Bigler 652-663; *Means for uniform color matching—problems and their solution,* by G. Smiatek 663-672; *Literature on textile chemistry and microscopy,* by H. Freihofer 673-675.

Standards for the determining of neps in the card web.

Swedish Textile Research Institute. *Textil-Praxis 11, No. 3:* 228 (1956); *in German.* Through *BCIRA 36:* 308 (1956).

The Swedish Textile Institute has developed a method for determining the quality of card webs, which consists in taking a card-web sample by means of a special device consisting of two Plexiglas plates, and comparing it with a set of photographed card webs with different numbers of neps. The set consists of 5 photographs with the grading numbers 1, 3, 5, 7, and 9, so that the samples can be classified with the numbers 0-10. The values obtained can be related to the weight of the sample and adjusted to a standard weight of 0.1 g.

FIBERS E 1

Abrasion testing on single fibers.

F. Winkler. *Faserforsch. u. Textiltech. 7, No. 2:* 73-80 (1956); *in German.* Through *BCIRA 36:* 289 (1956).

Abrasion tests were carried out on 12 different fiber types by means of the Zart abrasion tester. Various factors are considered theoretically and the effect of various variables (rotation direction of the shaft, type, thickness and wear condition of the bristles) are investigated, with reference to the reproducibility of the results and dependence of the abrasion values upon the load. Evaluation of the results is described.

A semi-micro extraction apparatus for determination of fatty matter in cotton fibers.

F. Franks. *(Letter to the editor). J. Textile Inst. 47:* T369-T370 (June, 1956).

Development of a suitable technique for the determination of halo length of cotton.

R. L. N. Iyengar and D. L. Sen. *Indian Cotton Growing Rev. 10:* 1-28 (January, 1956).

A statistical evaluation of the methods used at various Indian breeding stations and the Technological Institute resulted in the acceptance of the modified Coimbatore method as the standard to be used in measuring halo length.

Identification tests for hard fibers.

M. Goossens. *Industrie Textile:* 85-86 (February, 1956); *in French.* Through *BCIRA 36:* 290 (1956).

Methods are described and equations given for determining the stiffness, fineness and tenacity of the fibers, and methods for differentiating between Manila hemp and sisal fibers in yarn are briefly reviewed. A table shows the characteristics of unspun sisal and Manila hemp.

Environmental effects on changes in textile properties.

H. Sommer. *Faserforsch. u. Textiltech. 7, No. 1:* 1-13 (1956); *in German.* Through *BCIRA 36:* 220 (1956).

In this review, the author discusses the effect of relative air humidity and temperature on water-vapor sorption and on strength properties, permanent changes caused by the action of heat, and effects of temperature and humidity on other technological and mechanical properties and on the photochemical degradation of fibers. The examples given show how important it is to maintain a standard atmosphere during testing of textiles in order to ensure reproducibility and comparability of the test results. The environmental changes in the properties are also of importance for the evaluation of new fibers and their wear value. 36 references.

YARNS E 2

Contributions to the problem of uniformity testing.

H. Kob. *Ann. Sci. Textiles Belges No. 2:* 55-83 (June, 1956); *in German.*

The author reports that (1) tests of yarn on a Uster Model B evenness tester revealed a variation coefficient of 17.6 with the following standard deviations: 0.5 within-bobbins, 1.0% between-bobbins, and 1.0 between instruments (using 24 instruments). Standardization of testers, using a calibration film, is therefore recommended. (2) The author seeks to reveal the internal irregularity of slivers by extracting fiber bundles from a field of combs and weighing them, as a more adequate means of showing sliver quality. (3) A new

Flyertestwaage or balance for tests of roving is presented, as developed by the author, which is suitable for finding variation between 20 cm sections of roving. The scale does not require any mathematics to find variation coefficients, and because of its simplicity, is claimed to have found successful practical applications.

New method for the subjective evaluation of yarn irregularities.

R. Gunther and H. Hartenhauer. *Textil- u. Faserstofftech. 6, No. 1:* 10-14 (1956); *in German.* Through *BCIRA 36:* 225 (1956).

It was found that yarn irregularity can be visually more accurately evaluated in knitted fabrics than from the wrappings used in practice. This finding led to the development of a new method, which is based on examining the knitted sample in transmitted light. The counting of neps and impurities is in this way greatly facilitated and, at the same time, a preview is obtained of the appearance of the finished fabric.

Some notes on the theoretical principles of regularity measurements on yarns and slivers.

O. Konig. *Textil-Praxis 11, No. 2:* 125-129 (1956); *in German.* Through *BCIRA 36:* 225 (1956).

Statistical evaluation of sliver and yarn irregularity on the basis of probability calculation is discussed theoretically.

Use this method of evenness testing for better worsted yarns.

M. Romer (Industrial Rayon Corp.). *Modern Textiles Mag. 37:* 37-38, 42, 44 (July, 1956).

An Index of Irregularity (ratio of actual irregularity to the normal expected irregularity of material) was found to be effective in discussing data, comparing results, and charting quality progress. It allowed for a clear-cut interpretation of this difficult-to-express property of evenness of slivers, roving and yarns and permitted a superior evaluation of variations which in turn lead to important improvements in yarn quality. 6 references.

Variance-length curves for jute yarns: use of the Uster Evenness Tester.

S. B. Bandyopadhyay, S. R. Guha and S. S. Bhattacharji. *Fibres 17:* 185-191 (June, 1956).

Variance length curves for some typical jute yarns have been obtained by the cutting and weighing method and compared with values obtained with the Uster Evenness Tester. With some precautions for minimizing variations, the Uster-values have been found to agree fairly well with the weight-coefficient of variation % of cut yarn pieces. The effect of batching oil on Uster-determinations was found to be of little importance. These values were much higher when compared to the theoretical values obtained from fiber properties by Piccard's formula. Comments from Zellweger, Ltd., manufacturers of the Uster tester, on the data obtained with the instrument are included. Tables. Graphs. 16 references.

Mechanical tension meters. Part 2.

J. W. Y. Heijnis. *Enka Breda Rayon Rev. 10:* 64-75 (April, 1956).

Detailed construction and operation of the AKU compensating tension meter for a maximum of 5 kg and the direct-reading tension meter for 0 to 5 kg yarn tension. Photographs. Diagrams.

Results of gauging and checking up the Scott Inclined Plane Tester (IP-4) at regular intervals.

J. Lako and A. la Fleur. *Enka Breda Rayon Rev. 10:* 76-80 (April, 1956).

Results of check-overs and calibrations obtained during 1954 in the AKU and HKI plants in the Netherlands on 15 Scott testers are tabulated. Details of the tests and illustrations of the improvements obtained are included.

Limitations of the indirect untwist-twist and direct-counting methods for determining twist in carded cotton single yarns.

R. K. Worner (Southern Regional Research Laboratory). *Textile Research J. 26:* 455-459 (June, 1956).

The results given confirm published and unpublished findings of disagreement between untwist-twist tests and calculations from machine settings or actual counts by a direct-counting method. Limitations of the two methods are discussed and it is concluded that the principle of actually counting the turns of twist in cotton single yarns will remain the basis for the most reliable and suitable method for research and arbitration purposes. 14 references.

Automatic twist tester.

W. Frenzel and R. Kunze. *Faserforsch. u. Textiltech. 7, No. 2:* 53-63 (1956); *in German.* Through *BCIRA 36:* 290 (1956).

The known twist-counting methods are reviewed and a new automatic twist tester is described, which is based on the tension scanning method. The evaluation of the diagrams obtained is discussed and examples of their application to various yarns are given. 25 references.

New textile testing devices.

K. F. Seim. *Spinner u. Weber 74, No. 6:* 222-223 (1956); *in German.* Through *BCIRA 36:* 290 (1956).

Three types of dial indicators with attached elements for the unwinding and running-on thread, which may be combined with a thread-cleaning apparatus, knot catcher, etc., are described and illustrated. These indicators can be fitted to new or existing textile machinery.

Modification of the AATCC crockmeter for yarn testing.

C. R. Trommer (Boris Kroll Fabrics Laboratory). *Am. Dyestuff Reptr. 45:* 357-359 (June 4, 1956).

A dowel attachment to the standard crockmeter permits it to be used for yarn testing without impairing its effectiveness for use on fabrics. 18 references.

FABRICS E 3

Relation between grab strength and strip strength of fabrics.

T. Eeg-Olofsson and A. Bernskiold (Swedish Institute for Textile Research). *Textile Research J. 26:* 431-436 (June, 1956).

A relationship between strip and grab strength is theorized and the theory is shown to be in good agreement with tests performed on a continuous filament viscose rayon weave. 4 references.

Measurement of the extent of delustering of filament fabrics. Part 3. The reflection of polarized light.

R. Jeffries (British Rayon Research Assoc.). *J. Textile Inst. 47:* T319-T328 (June, 1956).

This paper completes the theory of the method of measuring the extent of deluster by describing, and discussing, in relation to structure, the reflection of plane-polarized light by filament yarns and fabrics and the effect of delustering on the depolarization. The conclusions drawn provide additional support for the interpretations of reflections in terms of structure put forward in the previous paper and show that the use of polarized light increases the sensitivity of the method of measurement of deluster.

The technique of cloth analysis in the case of shaft-woven fabrics.

E. Lichtenberg and J. Cremer. *Z. ges. Textil-Ind. 58, No. 3:* 84-90 (1956); *in German.* Through *BCIRA 36:* 226 (1956).

A correct cloth analysis comprises: distinguishing the warp from the weft; determining the type of material, yarn count, weave, tie-up and peg plan, and reed count; preparing a card of warping particulars; determining heddle distribution per individual shafts and weft density; examining the cloth with regard to its after-treatment and finishing, and noting its peculiarities.

Device for determining the creasing angle.

M. Schnabel. *Textil-Praxis 11, No. 3:* 278-279 (1956); *in German.* Through *BCIRA 36:* 323 (1956).

The device described for measuring the creasing angle makes it possible to read off the creasing angle of the fabric strip without touching it. A drawing is given.

A laboratory test for pilling.

R. E. Freeman (Imperial Chemical Industries Ltd). *Fibres 17:* 193-194 (June, 1956).

A pilling tester is described which gives reliable information on the probable performance of a fabric in normal wear. It differs from other testers in that abrasion is slight and pills are formed by a plucking and pulling out of fibers by means of a tumbling action. Photographs are included to show the results of wear tests and tumbler tests on the same fabrics.

A new laboratory technique for measuring the tendency of fabrics to pilling.

A. Marti, T. Belleli, and J. Guyennet. *Bull. Inst. Textile France No. 57:* 7-14 (December, 1955); *in French.* Through *BCIRA 36:* 293 (1956).

The method described is based on the use of the abrasion tester of the French Textile Institute, normally employed for producing and measuring the progressive wear of fabrics. This machine, slightly modified to reduce its rotation speed, makes it possible to obtain, under certain conditions, pilling of fabrics and to measure their tendency to pilling as a function of the number of revolutions of the machine.

Can the porosity of fabric be predetermined?

A. Durand. *Industrie Textile:* 129-131 (February, 1956); *in French.* Through *BCIRA 36:* 293 (1956).

The method described is based on the assumption that the fabric is perfectly homogeneous and on the choice of a fulled cloth with given characteristics. Theoretical formulae are given.

The estimation of copper-8-quinolinolate in mildewproofed fabrics.

A. Rose, A. W. Hutchison, J. R. Hayes, and I. R. Sharkey (Pennsylvania State College).

Am. Dyestuff Reptr. 45: 362-364 (June 4, 1956).

The method is based on the photometric determination at 410 mμ of the copper-8-quinolinolate in chloroform solution. In the recommended procedure the fungicide is removed from the fabric by boiling the sample in dilute sulfuric acid for a short time. After adjusting the pH of this solution to about 6, the copper-8-quinolinolate is extracted with chloroform. Other copper-containing fungicides such as copper naphthenate and copper hydroxy naphthenate do not interfere, nor do substances ordinarily employed to render fabrics water- and fire-resistant.

The determination of the formaldehyde yield of cellulose textiles treated with formaldehyde, urea-formaldehyde, or melamine-formaldehyde.

W. J. Roff (Shirley Institute). *J. Textile Inst. 47:* T309-T318 (June, 1956).

A method is described for the analysis of three permanent finishes based on formaldehyde. The finish is hydrolyzed by 12N sulfuric acid, without heating, and the yield of formaldehyde is assessed colorimetrically by means of the reaction with chromotropic acid. The method is critically examined, and its applications are illustrated by practical results from finishes on viscose rayon and cotton. 11 references.

New electrical methods used in chemical analysis of textiles.

W. Reif, E. Mantzell, and H. Lang. *Textil-Praxis 11, No. 2:* 175-179 (1956); *in German.* Through *BCIRA 36:* 221 (1956).

Experiments for determining the water content and pH and rH values are discussed. The electrical devices used for these determinations and the methods are described. 22 references.

OTHER E 4

Analysis of textile assistants.

J. A. Van der Hoeve. *Tinctoria 52, No. 12:* 477-481 (1955); *in Italian.* Through *BCIRA 36:* 227 (1956).

Literature referring to the analysis of textile assistants is reviewed and methods are given for determining organic nitrogen, the ionic nature of the compound tested, the nature of the hydrocarbon residue, and the solubilizing group in cationic, nonionic and anionic compounds. Some special identification tests (alkaline distillation, test with ammoniacal cobalt thiocyanate and other color reactions) are mentioned and analysis of binary mixtures of textile assistants is discussed.

New experiences in the practical use of physical and technological measurements on thickeners and printing pastes.

K. Schmidt. *SVF Fachorgan Textilveredlung 11, No. 2:* 54-65 (1956); *in German.* Summary in *BCIRA 36:* 284 (1956).

The high-temperature dyeometer: an instrument for studying color reactions at elevated temperatures.

R. Stanziola and F. Fordemwalt (American Cyanamid Co.). *Am. Dyestuff Reptr. 45:* 365-372 (June 4, 1956).

The High-Temperature Dyeometer is particularly adapted for obtaining quantitative dyeing data at 212°F to 300°F. Examples are described showing its application to measurements at temperatures above the boil, of (1) rates of chromation, (2) rates of decomposition of dyes and (3) rates of exhaustion of different kinds of dyes on different kinds of fibers. Graphs. Photographs. 10 references.

The identification of vat dyes.

D. A. Derrett-Smith and J. Gray. *J. Soc. Dyers Colourists 72:* 211-227 (May, 1956).

The tables published in 1940 by Derrett-Smith and Bradley and in 1947 by Derrett-Smith and Gee have been brought up to date to include all the British, German, and Swiss vat and solubilized vat dyes which have appeared on the British market since 1940. Color reactions are tabulated for alkaline and acid hydrosulfite, nitric and sulfuric acids. In some of those cases where the vat dyes are not easily identified by these reagents, an additional test has been found useful, viz. the reaction with acid potassium permanganate solution. In addition, it is shown that certain vat dyes behave differently when treated with sodium hydrosulfite and sodium hydroxide as compared with sodium hydrosulfite and sodium carbonate.

Detection of dyes possessing a p-phenylenediamine or a p-nitroaniline structure by means of spot tests.

F. Feigl and C. C. Neto. *J. Soc. Dyers Colourists 72:* 239-240 (May, 1956).

When Bandrowski's base and azo dyes containing a p-phenylenediamine or a p-nitroaniline structure are fused with a dry mixture of sodium formate and sodium hydroxide at 210-230°C. p-phenylenediamine is formed by reductive cleavage. Under these conditions the diamine sublimes and the vapor reacts with an acetic-acid solution of aniline and alkali-metal persulfate to yield the indamine dye Phenylene Blue. This procedure may be conducted by the technique of spot test analysis and serves to detect such dyes. The detection limits are in the range 5-10 μg., as has

been verified by testing thirteen pertinent compounds. 7 references.

INDUSTRIAL ENGINEERING F

Air conditioning unit for fiber research laboratories.

W. C. Timmerman (Anderson, Clayton & Co.). *(Letter to the editor). Textile Research J. 26:* 438-439 (June, 1956).

The ACCO Psychronditioner, using a variable temperature water spray system, is claimed to maintain standard conditions for precision fiber testing at low cost.

Wages and productivity.

A. Harrer. *Industrie Textile:* 7-10 (January, 1956); *in French.* Through *BCIRA 36:* 264 (1956).

In this review (25 references) the author discusses wage increases (living wage and incentive wage) in various countries, modes of wage payment (time and piece rates), and wage structure and its effect on productivity increase.

Costing for the hosiery trade. Parts 1 and 2.

W. W. Noakes (N. Corah (St. Margaret) Ltd). *Hosiery Trade J. 63:* 74-76 (May, 1956); 76-77 (June, 1956).

The function and principles of cost accounting are briefly summarized, and various aspects of budgetary control and methods of dealing with variations from standard costs are discussed.

MACHINERY AND MAINTENANCE F 1

Review of rubber uses in textile machinery.

K. Osterwalder. *Textil-Rundschau 11, No. 1:* 15-20 (1956); *in German.* Through *BCIRA 36:* 227 (1956).

The use of rubber in spinning machinery, in weaving, in the finishing industry, on textile testing devices and in fabrics is discussed.

WASTE DISPOSAL F 2

A critical review of the literature of 1955 on sewage, waste treatment, and water pollution. Parts 1 and 2.

H. Heukelekian and others. *Sewage and Ind. Wastes 28:* 595-636 (May, 1956); 707-764 (June, 1956).

Part 1 covers analytical methods (113 references), sewage (144 references) and radioactivity (149 references) and Part 2 covers industrial wastes (292 references), including sections on textile wastes (31 references) and wool scouring wastes (10 references), and water pollution (221 references).

A study on treatment of wool scouring liquors.

J. A. McCarthy. *Sanitalk 3, No. 3:* 17-18 (1955). Through *Water Pollution Abstr. 29:* 32 (January, 1956).

Studies on the treatment of wool scouring waste waters made by the Lawrence Experiment Station, Mass., have shown that wool scouring liquors with a B.O.D. of about 16,000 p.p.m. before coagulation can be satisfactorily treated by 2-stage biological filtration after dilution with 90% rinsing water.

QUALITY CONTROL F 3

Survey of control chart applications in textile processing.

N. L. Enrick (Institute of Textile Technology). *Textile Research J. 26:* 313-316 (April, 1956).

Survey of control chart applications in more than 50 mills in the U. S. and Canada, broken down by the four major categories of types of charts used: for sample averages, for sample ranges, for defects-per-unit and for percent defective. Applications cover raw materials, processing, and end-product control charts. 11 references.

S.Q.C.: a new management tool for the plastics industry.

Monsanto Chemical Co., Plastics Division, Springfield, Mass., 1956. 19 p.

A working outline of the basic principles of statistical quality control as an aid for plastic molders and fabricators in finding and maintaining the most economical level of quality production.

SCIENCES G

CHEMISTRY G 1

Fine structure elements of native cellulose fibers in highly diluted solutions.

H. Dolmetsch. *Kolloid Z. 145, No. 3:* 141-151 (1956); *in German.* Summary in *BCIRA 36:* 321 (1956).

Recent physico-chemical studies on cellulose and related carbohydrates.

B. G. Ranby, E. H. Immergut, and H. F. Mark. *Chem. Ber. 89, No. 2:* 526-534 (1956); *in German.* Through *BCIRA 36:* 231 (1956).

Differences in the behavior of celluloses from various sources (x-ray diffraction, behavior during mercerization and during heterogeneous and homogeneous hydrolysis) are discussed, with special reference to wood and cotton celluloses and the difference in their lattice and molecular structure. The relationship between cellulose and hemicellulose contents in pulps is studied on cellulose material rendered completely soluble by nitration and fractionated by extraction with solvent mixtures having increasing solvent power.

The reaction between cellulose and heavy water. Part 1. A qualitative study by infra-red spectroscopy. Part 2. Measurement of absolute accessibility and crystallinity. Part 3. A quantitative study by infra-red spectroscopy.

J. Mann and H. J. Marrinan (British Rayon Research Assoc.). *Trans. Faraday Soc. 52:* 481-497 (April, 1956).

Iodine sorption as an index of fiber crystallinity.

T. G. Majury (British Celanese Ltd). *(Letter to the editor). Textile Research J. 26:* 437 (June, 1956).

Contribution to the problem of cellulose oxidation.

W. Lang. *Papier, Darmstadt 10, No. 3/4:* 41-48 (1956); *in German.* Through *BCIRA 36:* 232 (1956).

In this review, the author discusses the degradation of cellulose during pre-ripening of viscose, with reference to the factors affecting the depolymerization of cellulose molecules and, at the same time, the general destruction of the cellulose structure, and methods for determining the extent of cellulose degradation. 42 references.

Bibliographical abstracts on redeposition of soil on cotton fabric.

American Society for Testing Materials. Committee D-12. Phila., 1956. 30 p. $1.00.

A review of the literature on the theory and practice of redeposition methods presented at a meeting of ASTM Committee D-12 on Soaps and Other Detergents, March 15, 1955, together with a bibliography containing 171 entries covering the period 1909 to 1953.

Carbon soil removal in the presence of polyphosphates and hard water.

Soap Chem. Specialties 32: 41-44, 180 (June, 1956).

An examination of the reasons for the addition of phosphates to synthetic detergents was made by two different laundering procedures, one a laboratory method using artificially soiled cotton fabric and a Launderometer and the other a practical home laundering procedure. It was found that in synthetic detergent mixes the primary function of phosphate is to soften the water. The ratio of detergent to phosphate required for optimum washing is determined by the amount of hard water used. This relationship holds for the anionic detergents whose calcium salts are highly soluble. Where their salts are insoluble (e.g. soaps and high molecular weight sulfates and sulfonates) then, the phosphate required is a sufficient excess to prevent precipitation of the detergent. In general, this amount of sequestrant will also prevent soil redeposition and give the highest detergency. 8 references.

New results regarding the adsorption of cellulose glycollate, by textile fibers, from colloidal solutions.

H. Stupel. *Kolloid. Z. 145, No. 3:* 140-141 (1956); *in German.* Through *BCIRA 36:* 324 (1956).

Experiments, carried out by using fluorescent microscopy and Acridine Orange as indicator, showed that, under conditions of the washing process, cellulose glycollate is adsorbed on the dirt. Under acid conditions, cellulose glycollate is adsorbed on the textile fibers; this adsorption mechanism differs essentially from that taking place during the washing process. The adsorption in acid medium also takes place in the presence of surface-active agents, pigments, silicates and metal oxides.

Processes during light exposure of dyed and undyed textiles.

A. Schaeffer. *SVF Fachorgan Textilveredlung 11, No. 3:* 106-134 (1956); *in German.* Through *BCIRA 36:* 324 (1956).

In this paper, a survey is made of the most important data in the field of photochemistry to explain processes taking place during exposure of dyeings to light. Papers referring to the determination of reaction rates, quantities of taken-up energy, etc., are not included, but reference is made to the general principles of photochemistry

and the behavior of quinones to light, the effect of light on textiles, changes in the dyes (on the fiber) and in the fiber under the action of light, the effect of dyes on fiber degradation, factors affecting the lightfastness of dyeings, and fiber-protecting agents. 158 references.

Electrolytic interaction of nylon with aqueous solutions of hydrochloric acid.

F. T. Wall and A. Beresniewicz. *J. Phys. Chem. 60:* 692-698 (May, 1956).

The absorption of hydrochloric acid by nylon fibers has been studied as a function of acid concentration. It is found that the initial stages of absorption qualitatively follow theoretical expectations based on a model involving interaction of HCl with the polymer end groups. If the nylon has an excess of amino over carboxyl end groups, then the absorption of HCl takes place in two stages which can be described more or less quantitatively by thermodynamic considerations. In the presence of concentrated hydrochloric acid solutions, nylon is found to absorb more HCl than would be expected from the number of amino groups present. This excess absorption is attributed to interaction with amide linkages. From the temperature coefficients of the various absorptions, heats of absorption are calculated for each of the stages. 21 references.

PHYSICS G 2

Collection efficiency of aerosol particles and resistance to flow through fiber mats.

J. B. Wong, W. E. Ranz and H. F. Johnstone (University of Illinois). *J. Appl. Phys. 27:* 161-169 (February, 1956).

The collection efficiencies for sulfuric acid aerosols of 0.4- to 1.3-microns particle diameter, and the resistance to flow through glass fiber mats composed of 3.5-, 6.2-, and 9.6-micron fibers, were investigated experimentally. The results agree with the theory that particle collection in this range is a function of the inertia of the particles, the interception by the fibers, and the nature of the flow around the fibers, and that the pressure drop is a function of the flow characteristics and the fiber interference effect. Theoretical equations for collection efficiency and pressure drop of fiber mats were analyzed in terms of the impaction efficiency and drag coefficient of single fibers. These equations were evaluated by comparing the apparent fiber efficiency and drag with theoretical values. 19 references.

The mechanics of plastics reinforcement in tension.

J. O. Outwater, Jr. (Massachusetts Institute of Technology). *Modern Plastics 33:* 156-162, 245, 248 (March, 1956).

A mathematical relationship is obtained for the tensile modulus of elasticity of unidirectionally reinforced plastics both for the case of continuous fibers and for the case where short fibers are used. By a comparison of these values it is possible to show the influence of various properties of the resin and fibers on the final properties of the laminate. In particular, it is shown that the adhesion between the resin and the fibers only influences the properties of the laminate before it is preloaded.

Heat transfer between a moving sheet and an atmosphere kept at a different temperature into which it enters.

A. H. Nissan (Leeds Univ.). *(Letter to the editor). J. Textile Inst. 47:* T48-T51 (January, 1956).

Derivation of equation for use in engineering calculations.

Polymer progress. 1956 series. Part 1. Polyoxamides.

J. A. Somers. *Man-Made Textiles 32:* 60-63 (February, 1956).

The polyoxamides are interesting as near relatives of the nylon family. They have many outstanding properties and so far as their production is concerned appear to be a good economic proposition.

Studies on the sorption of water vapor by polymers. The sorption of moisture by textile fibers in relation to their molecular structure.

L. Valentine (Univ. of Leeds). *Ann. Sci. Textiles Belges No. 4:* 206-230 (December, 1955); *in English.*

The moisture sorption of fiber-forming high polymers is considered in the light of the following hypotheses: (1) moisture sorption occurs mainly in the non-crystalline regions of the polymer; (2) at low or moderate relative humidities sorption is associated with specific polar sites; (3) each type of polar chemical group has a characteristic sorbing power or hygroscopicity at any given relative humidity, provided it is completely accessible to water vapor. Methods of altering the sorption characteristics of textile fibers by physical treatments or incorporating chemical compounds ("sorption modifiers") are also discussed. 60 references.

Contribution to the study of dry and wet cellulose by means of x-ray diffraction studies on ramie.

P. Antzenberger, G. Fournet and J. Rogué. *J. Polymer Sci. 18:* 47-54 (September, 1955); *in French.*

Small-angle x-ray measurements on cellulose.

O. Kratky and H. Sembach. *Angew. Chem. 67, Nos. 19/20:* 603-606 (1955); *in German.* Through *BCIRA 36:* 236 (1956).

Measurements on hydrolyzed cotton and on various samples of regenerated cellulose show that the micelles of native and of regenerated cellulose are ribbon-like in shape. The dimensions are the same for both forms of cellulose, supporting the opinion that the native micelles are not dissolved in the production of viscose.

Color and textiles. Part 1. Experiments in color. Part 2. Modification of color due to juxtaposition. Part 3. Color theory in relation to the size of color units used in textiles. Part 4. The blending of colored fibers.

P. Warburton, G. V. Lund, and P. H. Oliver. *J. Textile Inst. 47:* P305-P373 (May, 1956).

The theories and effects of simultaneous contrast and juxtaposition of color are presented and applied in the blending of fibers and yarns in fabrics. Color plates. Tables. Diagrams. 14 references.

Radioactive isotopes: their use in the textile industry. Parts 1 and 2.

H. E. Knobil. *Fibres 17:* 147-149 (May, 1956); 181-184 (June, 1956).

Part 1 discusses the modern concept of the behavior and composition of the atom and the dissipation of static charges by the use of radioactive eliminators. Part 2 covers the detection and measurement of radioactive particles and the use of isotopes in friction and lubrication studies, dyeing, roller printing, viscose rayon manufacture, wool drafting and polymerization studies. 16 references.

Static.

J. W. S. Hearle. *Skinner's Silk and Rayon Record 30:* 148-157 (February, 1956).

Static in textile processing and its elimination are discussed. A table of antistatic agents, giving manufacturer, trade name, properties, application, etc., is included.

The dielectric properties of fiber assemblies.

J. W. S. Hearle (Univ. of Manchester). *Textile Research J. 26:* 108-111 (February, 1956).

Previous work on the dielectric properties of yarns is extended to cover the frequency range, 100 kc./sec. to 10 Mc./sec. The effects of frequency and moisture are reviewed and discussed.

The generation and dissipation of static electricity in the textile industry.

J. Earnshaw. *Hexagon Digest No. 22:* 22-35 (October, 1955).

After a brief discussion of the origin of electrostatic charges and methods of dissipating static charges, methods and apparatus for evaluation of anti-static agents are described. 11 references.

Electrostatic charges in plastics.

S. M. Skinner, J. Gaynor, and G. W. Sohl. *Modern Plastics 33:* 127-136, 246 (February, 1956).

Experimental evidence is presented that the static charge on plastics is a volume charge distribution rather than a surface distribution. The charge contained in a plastic that has been in contact with metal is found to drain out of the plastic by a flow process which depends both upon the resistivity of the plastic and upon the possibility of neutralization of surface charges by opposite charges external to the plastic such as in air. Flow patterns similar to those resulting from several sources of fluid flow are observed when holes are torn in the surface of the plastic during break of an adhesive sample. The observations are confirmed by the transfer of charges in frictional sliding of plastics on metals. Charging proportional to the weight of plastic slid, and transfer of plastic to the metal also proportional to the total amount slid are observed. Practical applications to the control of static charges on polymers and to adhesion technology are indicated. 10 references.

BIOLOGY G 3

Danger to shoe seams through microbial and chemical fiber damage.

M. Kappel. *Textil-Praxis 10, No. 10:* 1002-1006 (1955); *in German.* Through *BCIRA 36:* 37 (1956).

Bacterial and chemical factors causing the destruction of the textile thread used for shoe sewing are discussed, with special reference to the effect of perspiration on the strength of yarn.

Effectiveness of paradichlorobenzene in plastic garment bags.

J. W. Arnold. *Soap Chem. Specialties 32:* 121-124, 167, 169 (February, 1956).

On the basis of insect mortality and permeability studies in a series of structurally different garment bags certain minimum limits of plastic permeability and PDB dosage are recommended.

MISCELLANY H

New industry research in textiles.

J. Home Econ. 48: 177-183 (March, 1956).

Brief survey of current commercial research on fibers and the fabrics. *Synthetic fibers,* by J. B. Quig; *Acetate and triacetate,* by A. F. Tesi; *Rayon,* by J. B. Goldberg; *Cotton,* by N. Getchell; and *Wool,* by G. Laxer.

Textile research achievements in 1955.

J. B. Goldberg. *Modern Textiles Mag. 37:* 74-80 (February, 1956).

Textiles on postage stamps.

Enka Breda Rayon Rev. (English ed.) 9: 201-208 (December, 1955).

Seventy-five postage stamps on textile subjects are reproduced in color.

Handy textile dictionary in 5 languages.

Waclaw Fabierkiewicz. Warsaw, Poland: Panstwowe Wydawnictwa Techniczne, 1955. 306 p. Available from Albert Daub and Co., Inc., 257 Fourth Avenue, New York 10, N. Y. $6.75.

This 5-language dictionary has an introduction (in Polish) describing the different textile processes and demonstrating the usage of terms relating to raw materials, spinning, weaving, knitting, and finishing. The entries are arranged in alphabetical order (according to Polish terms), with Russian, English, French, and German equivalents and separate indexes of Russian, English, French, and German terms.

Tufted textiles 1956: study of the tufted textile industry.

Textile Ind. 120: 137-182 (June, 1956).

Tufted textiles—progress and problems, by E. T. Barwick; *Quality control—blueprint for tufted textiles,* by J. L. Fesperman; *Quality brought quantity to E. T. Barwick Mills; Hazlehurst Mills weave jute for tufted carpets; Tufted textiles—news and opinion.*

Textile terms and definitions.

J. Textile Inst. 47: P280-P282 (April, 1956).

Tentative definitions for bulked and stretch yarns.

Textile research and development in U. S.

G. G. Whytlaw (American Viscose Corp.). *Can. Textile J. 72:* 47-52 (May 18, 1956).

Outline of recent developments in tufted rayon carpets, tricot beams of acetate yarn, wash and wear fabrics, rayon denim, bulk yarns, and industrial applications of rayon.

Annual Conference of the Textile Institute at Blackpool, May 22-26, 1956.

Hosiery Trade J. 63: 86-89 (June, 1956).

Summary of papers of interest to the hosiery and knitted goods industry: *Processing and properties of knitted stretch fabrics,* by D. L. Munden and A. W. Astle-Fletcher; *Developments in man-made fibers,* by H. Ashton and J. Boulton; *Shrink-resist wool: new process,* by A. N. Davidson and R. Preston; *Textured filament yarns,* by L. G. Ray.

Continental machinery.

Textile Merc. 134: 636-641 (April 20, 1956); *Textile Wkly. 56:* 1128-1130 (April 20, 1956).

Some highlights of the Spring Exhibitions at the Swiss Industries Fair in Basle (April 14-24), at the Milan Fair (April 12-27) and at the Hanover Fair (April 29-May 8).

Hanover Fair.

Textile Wkly. 56: 1174-1180 (April 27, 1956); 1294-1298 (May 4, 1956); *Dyer 115:* 791-793 (May 11, 1956).

Accent on warp knitting at 1956 Hanover Fair.

Hosiery Trade J. 63: 78-84 (June, 1956).

The Swiss Industries Fair at Basle.

Textile Merc. 134: 675-678 (April 27, 1956); 709-713 (May 4, 1956); 750-756 (May 11, 1956); 827-828 (May 25, 1956); *Am. Textile Reptr. 70:* 18-20, 47-48, 53 (May 24, 1956); *Textile Recorder 74:* 62-65 (June, 1956); *Man-Made Textiles 33:* 65-69 (June, 1956).

First National Industrial Textile Trade Fair in London.

Man-Made Textiles 33: 54-56, 62 (June, 1956).

Wide range of knitting machinery at 34th International Samples Fair at Milan.

J. B. Lancashire. *Hosiery Trade J. 63:* 64-72 (June, 1956).

PATENT CHECKLIST

U. S. Patents may be obtained from the U. S. Patent Office, Washington 25, D. C., for 25 cents per copy. Photostatic copies of foreign patents are available. Charges for these photostats are based on the number of pages in the patent.

FIBERS A

MAN-MADE FIBERS A 2

Process of shrinking polyvinyl alcohol fibers and acetylizing with mixture of mono- and di-aldehydes for the preparation of oriented polyvinyl alcohol fibers of desirable water resistance.

E. T. Cline (to E. I. du Pont de Nemours and Co.). USP 2 749 208, June 5, 1956.

YARN PRODUCTION B

Manufacture of spun textile yarns or threads.

C. O. Mullenschlader (Germany). USP 2 748 558, June 5, 1956.

Yarn tensioning device.

E. J. Heizer and E. A. Wentz (to Specialties Development Corp.). USP 2 750 130, June 12, 1956.

OPENING, PICKING, FIBER PREPARATION B 1

Fire extinguisher and static arrester system for seed cotton precleaner.

W. R. Bryant. USP 2 751 630, June 26, 1956.

CARDING AND COMBING B 2

Fluff and dust removing systems for cotton and like carding machines.

S. Holt and C. V. Ward (Atmospheric Control Ltd). BP 737 038, September 21, 1955. Through *BCIRA 36:* 275 (1956).

Drive mechanism for textile combing machines.

J. R. Foster and R. S. Cartwright (to T.M.M. (Research) Ltd). USP 2 748 616, June 5, 1956.

DRAWING AND ROVING B 3

Roving guides for textile fiber drafting mechanisms.

J. Noguera (to Casablancas High Draft Co. Ltd). BP 737 010, September 21, 1955. Through *BCIRA 36:* 276 (1956).

Textile drawing frames.

P. Ferrario, G. Bollini, and G. Moro (to Officina Meccanica Pierino Ferrario & Cia). BP 737 049, September 21, 1955. Through *BCIRA 36:* 276 (1956).

Mounting for apron-guiding means in textile drafting apparatus.

R. J. Summers (to T.M.M. (Research) Ltd). BP 737 400, September 28, 1955. Through *BCIRA 36:* 276 (1956).

Double-apron high-drafting mechanism for textile spinning and preparatory machines.

Zellwolle Lehrspinnerei GmbH. BP 737 451, 452, September 28, 1955. Through *BCIRA 36:* 275 (1956).

Apron-type drafting mechanism of textile spinning and preparatory machines.

Zellwolle Lehrspinnerei GmbH. BP 737 466, September 28, 1955. *BCIRA 36:* 275 (1956).

Feed control means for drawing apparatus.

E. H. McAngus (to West Point Mfg. Co.). USP 2 749 573, June 12, 1956.

Textile drawing roll.

L. W. Pray (to Saco-Lowell Shops). USP 2 749 574, June 12, 1956.

Apparatus for stripping accumulated fibers and the like from textile clearer rolls.

G. W. Mitchell. USP 2 751 621, June 26, 1956.

Textile drafting apparatus.

W. A. Hunter, R. M. Blackburn and W. Nutter (to T.M.M. (Research) Ltd). USP 2 751 631, June 26, 1956.

Textile drawing mechanism.

E. F. Dausch (to SKF Kugellagerfabriken GmbH). USP 2 751 632, June 26, 1956.

Method of stripping clearer rolls.

G. W. Mitchell. USP 2 752 273, June 26, 1956.

SPINNING, WINDING, TWISTING B 4

Textile spinning and doubling machines.
O. W. Burkhardt (to Eisenwerk Hensel Bayreuth). BP 736 594, September 14, 1955. Through *BCIRA 36:* 277 (1956).

Yarn uptwisting machines.
F. Scragg (to S. and E. Scragg Ltd). BP 736 626, September 14, 1955. Through *BCIRA 36:* 277 (1956).

Process for the twisting of nylon thread.
J. Billion. BP 737 039, September 21, 1955. Through *BCIRA 36:* 277 (1956).

Method and machine for spinning textile yarns.
W. Frenzel. BP 737 059, September 21, 1955. Through *BCIRA 36:* 276 (1956).

Fluted bottom roller for a spinning machine.
S. Takita. BP 737 209, September 21, 1955. Through *BCIRA 36:* 276 (1956).

Ring traveler.
A. D. Carter. USP 2 748 559, June 5, 1956.

Apparatus for mounting travelers on ring twisters.
J. Rouillon (to Societe Chimotex). USP 2 749 601, June 12, 1956.

Ring traveler.
G. Stahli (to J. Jacob Rieter & Cie, AG). USP 2 749, 698, June 12, 1956.

Suction device for holding the thread ends of full bobbins.
S. Furst and W. Kupper (to Walter Reiners). USP 2 750 125, June 12, 1956.

Bearing means for spinning and doubling spindles.
H. Fink and J. Steichelę (to SKF Kugellagerfabriken GmbH). USP 2 750 237, June 12, 1956.

Bearing unit for spindles of spinning frames and twisting frames.
E. Rogner and J. Steichele (to SKF Kugellagerfabriken GmbH). USP 2 750 239, June 12, 1956.

Winding machine.
C. A. Freeland (to J. Rawson & Sons Ltd). USP 2 751 160, June 19, 1956.

Doffing a winding machine.
P. W. Markwood, J. T. Rich, P. D. Lingerfelt and C. F. Nichols (to American Enka Corp.). USP 2 751 161, June 19, 1956.

Thread tensioning device for a double twister.
J. Beyer (to American Enka Corp.). USP 2 751 166, June 19, 1956.

Donning mechanism for continuous spinning machines.
J. B. Busquets and P. B. Forgas (Spain). USP 2 751 746, June 26, 1956.

Process of producing dual twist nylon yarn.
A. Burleson (to Patentex, Inc.). USP 2 751 747, June 26, 1956.

Yarn winding machine.
F. F. Stange (to Foster Machine Co.). USP 2 752 100, June 26, 1956.

Releasing means for automatic bobbin winders when the amount of yarn wound falls below a predetermined level.
A. D. Harmon (to Deering Milliken Research Corp.). USP 2 752 101, June 26, 1956.

Spool supply apparatus for textile winding machines.
S. Furst (to Walter Reiners). USP 2 752 102, June 26, 1956.

Thread-fault responsive stop-motion apparatus for coil winding machines.
S. Furst (to Walter Reiners). USP 2 752 103, June 26, 1956.

Stop-motion apparatus for controlling the thread feeler means of a textile winding machine.
S. Furst (to Walter Reiners). USP 2 752 104, June 26, 1956.

Winding machine.
J. V. Keith (to Universal Winding Co.). USP 2 752 105, June 26, 1956.

YARNS B 5

Machines for wrapping spools or bobbins and tubes.
H. Preston (to English Sewing Cotton Co. Ltd). BP 736 684, September 14, 1955. Through *BCIRA 36:* 279 (1956).

Chenille yarns and their manufacture.
W. A. Rice (to Mohasco Industries, Inc.). USP 2 748 444, June 5, 1956.

Cellulose organic acid ester yarn structure.
J. C. White (to Eastman Kodak Co.). USP 2 750 653, June 19, 1956.

FABRIC PRODUCTION C

WARPING, SLASHING, YARN PREPARATION C 1

Sizing textile yarns with poly-triethyleneglycol adipamide.

J. F. Harris and J. M. Williams (to Imperial Chemical Industries Ltd). BP 737 691, September 28, 1955. Through *BCIRA 36:* 279 (1956).

Thread cleaner.

P. A. Tanner and W. Gegenschatz (to Zellweger AG). USP 2 749 594, June 12, 1956.

WEAVING C 2

Loom harness.

J. J. Kaufman (to Steel Heddle Mfg. Co). BP 736 532, September 7, 1955. Through *BCIRA 36:* 279 (1956).

Jacquard machines.

C. T. Dracup and G. Dracup (to Samuel Dracup & Sons Ltd). BP 736 546, September 7, 1955. Through *BCIRA 36:* 280 (1956).

Center weft fork motions for looms for weaving.

N. Hargreaves. BP 736 771, September 14, 1955. Through *BCIRA 36:* 280 (1956).

Device for threading shuttles in automatic looms.

Coeurtys SA (Switzerland). BP 736 951, September 14, 1955. Through *BCIRA 36:* 280 (1956).

Splicing of woven fabrics made substantially of synthetic resin fibers having fringes of warp yarns on the edges to be joined.

J. D. Skeer and K. H. Dunlap (to F. C. Huyck & Sons). USP 2 748 445, June 5, 1956.

Single shaft loom.

J. Stuer. USP 2 748 806, June 5, 1956.

Shuttle tips.

J. J. Kaufmann, Jr. (to Steel Heddle Mfg. Co.). USP 2 748 807, June 5, 1956.

Filling knife loom-stop attachment.

H. C. Lovely. USP 2 748 808, June 5, 1956.

Weft thread control in looms for weaving.

E. Pfarrwaller (to Sulzer Freres). USP 2 749 946, June 12, 1956.

Method of making loom picker from polyvinyl alcohol and product.

J. W. Baymiller (to Armstrong Cork Co.). USP 2 750 348, June 12, 1956.

The method of making a float pile carpet.

F. W. E. Hoeselbarth (to C. H. Masland & Sons). USP 2 750 964, June 19, 1956.

Looms for weaving pile fabrics.

I. S. Porter (England). USP 2 750 965, June 19, 1956.

Harness mechanism for loom.

B. W. Brouwer and A. Palmer (to Crompton & Knowles Loom Works). USP 2 750 966, June 19, 1956.

Picker stick check.

M. M. Parrish and W. L. Parrish. USP 2 750 967, June 19, 1956.

Beat-up motion for looms.

N. E. Klein (to Deering Milliken Research Corp.). USP 2 750 968, June 19, 1956.

Pattern control for Axminster loom.

L. N. Linscott (to Alexander Smith, Inc.). USP 2 751 937, June 26, 1956.

Double lift shedding motion.

H. Staubli and W. Wicker (to Gebruder Staubli & Co.). USP 2 751 938, June 26, 1956.

KNITTING C 3

Knitting method.

H. S. de Leysat (France). USP 2 748 579, June 5, 1956.

Cam setting mechanism for a knitting machine.

R. E. Zeruneith. USP 2 748 580, June 5, 1956.

Needle bed for needles serving for the manufacture of knitted fabrics.

E. Luchsinger (to Fibra AG). USP 2 748 581, June 5, 1956.

Safety mechanism for knitting machines having a lace point.

R. P. Loeper and W. F. K. Mueller (to Textile Machine Works). USP 2 748 583, June 5, 1956.

Circular knitting machine.

O. Griesbach (to Bayerische Berg-, Hutten- und Salzwerke AG). USP 2 749 728, June 12, 1956.

Needle bed structure for warp knitting machines.

H. C. Noe (to Kidde Mfg. Co., Inc.). USP 2 749 729, 730, June 12, 1956.

Floating yarn cutter mechanism for circular knitting machine.

A. M. Moser (to B. P. Jones). USP 2 749 731, June 12, 1956.

Doffing attachment for hosiery loopers.

G. F. Starnes (to G. A. and W. E. Starnes). USP 2 749 857, June 12, 1956.

A knitting machine yarn loop forming mechanism.

E. Bellini (to Vanity Fair Mills, Inc.). USP 2 750 772, June 19, 1956.

Thread-feeding attachment for knitting frames.

P. Virchaux and H. Korber (Switzerland). USP 2 750 773, June 19, 1956.

Plain and rib high-speed circular knitting machine.

B. Lebocey (France). USP 2 751 768, June 26, 1956.

Picking mechanism for a circular, independent needle, knitting machine.

J. Wawzonek (to Hemphill Co.). USP 2 751 769, June 26, 1956.

Yarn lever control mechanism for a circular, independent needle, knitting machine.

E. St. Pierre and J. Wawzonek (to Hemphill Co.). USP 2 751 770, June 26, 1956.

Circular weft knitted fabric and garment.

E. Overfield-Collins and A. P. Saunders (to Wildt and Co. Ltd). USP 2 751 771, June 26, 1956.

FABRICS C 4

The use of direct-spun rayon yarns for producing puckered effects in fabrics.

C. E. Neisler (to Neisler Mills Inc.). BP 736 616, September 14, 1955. Through *BCIRA 36:* 280 (1956).

Preparation of mixed fabrics for use as interlinings in fused fabric assemblies.

E. B. Higgins (to Trubenised (Gt. Britain) Ltd). BP 736 851, September 14, 1955. Through *BCIRA 36:* 281 (1956).

Manufacture of fabrics incorporating elastic threads which are prevented from stretching during weaving by wrapping them with yarns of a soluble alginate.

P. E. F. Clay. BP 736 954, September 14, 1955. Through *BCIRA 36:* 281 (1956).

Tufted rug and method of making same.

F. H. Mason (to General Latex & Chemical Corp.). USP 2 748 446, June 5, 1956.

Process of making a permanently embossed elastic webbing.

J. V. Moore (to Moore Fabrics, Inc.). USP 2 748 447, June 5, 1956.

Resilient floor rug.

S. D. Menzies and R. S. Nogler. USP 2 748 448, June 5, 1956.

Double layer fabric with puckered upper layer and method of making same.

G. G. Slough (to Kanmak Textiles, Inc.). USP 2 749 947, June 12, 1956.

Method and apparatus for making nonwoven fabric.

F. W. Manning. USP 2 750 317, June 12, 1956.

Pile rug and rug base.

J. J. Petroske (to Patchogue-Plymouth Mills Corp.). USP 2 750 652, June 19, 1956.

Terry pile weave.

F. W. E. Hoeselbarth (to C. H. Masland & Sons). USP 2 750 969, June 19, 1956.

Cellulose, nylon, glass or wool flock-filled isocyanate-containing elastomer characterized by improved tear resistance.

F. S. Martin (to United States Rubber Co.). USP 2 751 363, June 19, 1956.

Anti-slip surface for carpeting.

W. R. Keen (to Collins & Aikman Corp.). USP 2 752 277, June 26, 1956.

Embossed laminated foam rubber and fabric material and method of making same.

S. W. Alderfer (to Kendall Co.). USP 2 752 279, June 26, 1956.

FINISHING AND CHEMICAL PROCESSING D

CHEMICAL PROCESSES D 1

Method of imparting a permanent fragrance to fabrics.

H. Pichlmayr. BP 735 684, August 24, 1955. Through *BCIRA 36:* 256 (1956).

Flame- and water-proofing of cellulose textile materials.

C. W. King and F. Ward (to Courtaulds Ltd). BP 736 598, September 14, 1955. Through *BCIRA 36:* 288 (1956).

Processes for the production of pattern effects and relief effects on textile fabrics by the local precipitation of plastics.

Heberlein & Co. AG. BP 736 663, September 14, 1955. Through *BCIRA 36:* 287 (1956).

Continuous chemical treatment of fibers, particularly cotton.

Johnson and Johnson Ltd. BP 737 078, September 21, 1955. Through *BCIRA 36:* 275 (1956).

Machine for the treatment of textiles with liquids.

G. Hulse and H. A. Vodden (to Monsanto Chemicals Ltd). BP 737 401, September 28, 1955. Through *BCIRA 36:* 288 (1956).

Device for the wet treatment of artificial threads.

K. J. Schulze (to American Enka Corp.). USP 2 748 587, June 5, 1956.

Reel for the fluid treatment of thread.

H. A. Kuljian. USP 2 748 588, June 5, 1956.

Process of impregnating cellulosic materials with copper in chemically bound relation with the cellulose for increasing the immunity of cellulosic materials to organic agents of decay.

R. R. Bottoms (to National Cylinder Gas Co.). USP 2 749 256, June 5, 1956.

Process for the wash-resisting fixation of mechanically produced effects on textile material by urea-formaldehyde impregnation.

E. Knup, R. Aenishaenslin and G. Widmer (to Ciba Ltd). USP 2 749 257, June, 5, 1956.

Spray apparatus for applying liquids and tints to textile fibers.

J. W. Powischill and E. M. Hyde (to Proctor & Schwartz, Inc.). USP 2 749 736, June 12, 1956.

Apparatus for removing liquids from annular wound packages.

F. F. Long (to American Viscose Corp.). USP 2 750 039, June 12, 1956.

Composition and method for rendering a textile fabric water-repellent with silicone resins.

D. M. Gagarine and H. Repokis (to Deering Milliken Research Corp.). USP 2 750 305, June 12, 1956.

Treatment of textile materials with quaternary ammonium compounds to impart permanent water-repellent properties.

R. A. Pingree and C. U. Stevens (to Crown Chemical Corp.). USP 2 750 306, June 12, 1956.

Thread advancing reel having liquid applicator and wiper.

J. H. Givens, L. Rose and J. Wale (to Industrial Rayon Corp.). USP 2 750 780, June 19, 1956.

Apparatus for treating and finishing hosiery.

S. Bailey, Jr. USP 2 750 781, June 19, 1956.

Thread liquid treating apparatus.

H. A. Kuljian. USP 2 750 783, June 19, 1956.

Bleaching of polyacrylonitrile fibers.

H. W. Coover, Jr., J. E. Guillet and E. V. Martin (to Eastman Kodak Co.). USP 2 751 277, June 19, 1956.

Process for the chemical modification of cotton sliver with sodium hydroxide solution.

W. A. Reeves, J. R. Corley and J. D. Guthrie. USP 2 751 278, June 19, 1956.

Process for producing crease resistant and wrinkle resistant cotton and rayon.

F. E. Condo and C. W. Schroeder (to Shell Development Co.). USP 2 752 269, June 26, 1956.

DYEING AND PRINTING D 2

Apparatus for printing knitted articles of footwear.

E. G. Harding (to Samar Machines Ltd). BP 736 650, September 14, 1955. Through *BCIRA 36:* 287 (1956).

Process for producing on acetyl cellulose and linear polyamide and polyurethane fibers dyeings fast to cross-dyeing.

Farbwerke Hoechst AG. BP 737 270, September 21, 1955. Through *BCIRA 36:* 287 (1956).

Process for coloring cellulosic textile materials with metalliferous azo-dyestuffs sparingly soluble in water.

K. Menzi and J. Wegmann (to Ciba Ltd). USP 2 749 206, 207, June 5, 1956.

Process of coloring an amino lower-alkylated cellulosic textile.

W. A. Reeves and J. D. Guthrie. USP 2 750 249, June 12, 1956.

Method for dyeing polyacrylonitrile fabrics.

A. F. Lindenstruth (to E. I. du Pont de Nemours and Co.). USP 2 750 250, June 12, 1956.

Developable trisazo dyes for cotton.

O. B. Billings (to E. I. du Pont de Nemours and Co.). USP 2 750 376, June 12, 1956.

MECHANICAL PROCESSES D 3

Means for consolidating layers of fabric impregnated with a thermoplastic into a belt by dielectric heating.

A. T. Kinder and K. W. Brook (to Metropolitan-Vickers Electrical Co. Ltd). BP 737 424, September 28, 1955. Through *BCIRA 36:* 288 (1956).

Apparatus for boarding and presetting textiles by radiant heat.

F. M. Southerland (to Sarco, Inc.). USP 2 745 191, May 15, 1956.

Tentering machines.

H. Ainsworth. USP 2 746 117, May 22, 1956.

A cloth roll adapted to be rotated and to have fabric wound thereon.

L. M. Rogers (to Draper Corp.). USP 2 746 693, May 22, 1956.

Apparatus for uncurling the edges of a fabric having curled edges.

J. J. Bramhall, Jr. and R. T. Scott (to American Viscose Corp.). USP 2 747 250, May 29, 1956.

Inching device for automatic drum web winder.

F. F. Kaiser (to John Waldron Corp.). USP 2 747 808, May 29, 1956.

Folding apparatus for traveling web material.

S. Cohn, E. Cohn and J. G. Walter (to Samcoe Holding Corp.). USP 2 749 115, June 5, 1956.

Sheet folding apparatus.

M. W. Hayden (to Fieldcrest Mills, Inc.). USP 2 749 116, June 5, 1956.

Fabric napping mechanism.

M. W. Hayden (to Fieldcrest Mills, Inc). Co.). USP 2 749 593, June 12, 1956.

Apparatus for maintaining the selvage of a web of traveling fabric or the like uncurled.

K. S. Laurie (to John Dalglish & Sons Ltd). USP 2 750 650, June 19, 1956.

Fabric rewind roll suspension and bearing.

F. Saco and L. Rockstrom (to Cameron Machine Co.). USP 2 751 164, June 19, 1956.

Guiding devices for cloth to be wound into a roll.

P. Levine. USP 2 752 151, June 26, 1956.

DRYING D 4

Apparatus for applying the pressure roller in a squeezing mill.

Lindauer Dorinier GmbH. BP 737 337, September 21, 1955. Through *BCIRA 36:* 288 (1956).

Machine for drying tubular fabric and the like.

E. H. Johnson (to Fitch Textile Co., Inc.). USP 2 750 649, June 19, 1956.

Handling apparatus for textile fabric in a reel type dryer.

J. Cohn, J. G. Walter and E. Cohn (to Samcoe Holding Corp.). USP 2 750 679, June 19, 1956.

TESTING AND MEASUREMENT E

YARNS E 2

Yarn reeling apparatus for use in the determination of yarn denier.

A. F. Guyler and A. W. Caughey (to British Celanese Ltd). BP 737 687, September 28, 1955. Through *BCIRA 36:* 294 (1956).

FABRICS E 3

Fabric testing apparatus for determining quality characteristics of fabrics.

H. W. Stiegler. USP 2 749 740, June 12, 1956.